NOVEMBER 2005

Smithsonian

SPECIAL ANNIVERSARY ISSUE

35 WHO MADE A DIFFERENCE

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Smithsonian

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I would hate to imply that it's only Bill's intellect and business sensibilities that drive his philanthropy. It's his heart.

—JIMMY CARTER ON BILL GATES (BELOW), PAGE 36

KEN KELLER / CORBIS

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—"MAYA LIN," PAGE 100

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ENRICO FERORELLI

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NOVEMBER 2005 - MARCH 2006

Welcome to CultureSpotter, a monthly listing of some of the most interesting cultural events around the globe.
(Dates subject to change)

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All Across Oregon
www.traveloregon.com/bounty

January 10 – 21
THE WILDSIDE FESTIVAL
Old Montreal, Quebec
www.centaurtheatre.com

January 14 – 15
ICE FESTIVAL
Leavenworth, Washington
www.leavenworth.org/events/january.html

February 17 – 19
WOMADELAIDE 2006
Botanic Park, Australia
http://womad.org

February 17 – 27
BANGKOK INTERNATIONAL FILM FESTIVAL
Bangkok, Thailand
www.bangkokfilm.org

March 3 – 5
CRAFTSMEN'S CLASSIC ARTS & CRAFTS FESTIVAL
Columbia, South Carolina
www.gilmoreshows.com/craftsmens_classics_columbia_spring.shtml

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NFAA.ARTSawards.org

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NOXIOUS BOGS & AMOROUS ELEPHANTS

SMITHSONIAN'S BIRTH, 35 YEARS AGO,
ONLY HINTED AT THE SPLENDORS TO FOLLOW **BY CAREY WINFREY**

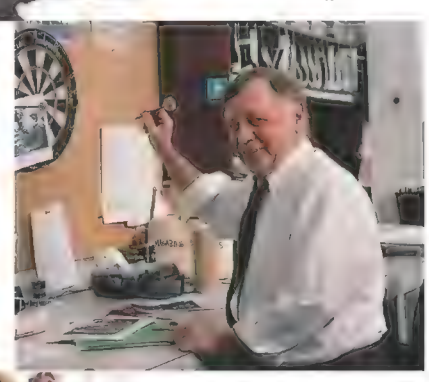
LOOKING BACK at this magazine's beginnings 35 years ago, I'm struck by just how much of the founding editor's aspirations still apply. Edward K. Thompson, who had retired as editor of the weekly *Life*, was recruited by the then Secretary of the Smithsonian, S. Dillon Ripley, to produce a magazine "about things in which the Smithsonian is interested, might be interested or *ought* to be interested."

"The magazine I envisioned," Thompson recalled in his lively 1995 memoir, *A Love Affair with* Life *&* Smithsonian, "would stir curiosity in already receptive minds. It would deal with history as it is relevant to the present. It would present art, since true art is never dated, in the richest possible reproduction. It would peer into the future via coverage of social progress and of science and technology. Technical matters would be digested and made intelligible by skilled writers who would stimulate readers to reach upward while not turning them off with jargon. We would find the best writers and the best photographers—not unlike the best of the old *Life*."

Edwards Park, a member of the original staff, recalled the magazine's unprepossessing beginnings for the tenth anniversary issue: "We were moved all over the place. There was one interior storage room where four of us ended up—staring at walls without windows, gasping for oxygen. Inevitably it was dubbed the Black Hole, and one claustrophobe moved out of it himself and placed his desk directly outside the Editor's office to serve as a haunting prod to the administrative conscience. For a while I was assigned to a tower, a lovely aerie with three windowed walls. But the heating-cooling system hemorrhaged fatally all over the rug and turned the office into a noxious bog."

Like most newborns, the magazine took a tumble or two at first. The circulation department solicited NBC News with the salutation, "Dear Mr. News"—a gaffe that anchorman John Chancellor was happy to share with his millions of viewers. And the *Washington Post* published a story saying, erroneously, that the Smithsonian Institution's Board of Regents "voted . . . to recommend the suspension of ambitious plans for a national magazine."

Somehow, in April 1970, the first issue reached 160,000 readers with a cover story about amorous elephants in Ceylon (now Sri Lanka), a rumination on the give-and-take between man and his environment, a selection of treasures from the Metropolitan Museum of Art (celebrating its 100th anniversary), starfish devouring Pacific coral reefs, a new black studies program at the University of Maryland and controversial conclusions about human overpopulation drawn from an experiment with mice and rats. Not too shabby a lineup.



From top: Thompson, Moser and Winfrey. At heart, it's still the magazine that Ed Thompson envisioned.

The magazine turned a profit in only its third year and has been contributing to Institution coffers ever since. Within four years, circulation had nearly quadrupled, to 635,000, and it reached the one million milestone in 1975—one of the most successful launches of its time.

Thompson, who retired in 1980 after ten years at the helm, was succeeded by Don Moser, also a *Life* veteran. Moser broadened the magazine's editorial range and took the circulation to two million (more than seven million monthly readers) where it remains to this day. Moser also doubled Thompson's tenure, editing the magazine for 20 years, before retiring in 2001. (Don's profile of John Dobson can be found on page 58.)

Which makes me only the third editor of SMITHSONIAN. Like my predecessors, I believe our educated, well-traveled, demanding readers want thoughtful—even challenging—journalism about history, nature, science and the arts. And stunning photography. And a dollop of wit now and then.

I've introduced a few new departments and tried to make the magazine a bit more topical. But the great franchise entrusted to me in July 2001 remains at heart the magazine that Ed Thompson envisioned and that Don Moser turned into one of the world's most respected periodicals. We have a proud heritage, a dedicated staff, talented contributors and among the most loyal readers anywhere. It's a privilege to edit SMITHSONIAN. Here's to the next 35 years!

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One of a Kind

From the beginning, SMITHSONIAN *has looked beyond the Institution*

IN SMITHSONIAN'S 35 years the magazine has played a unique role not only in the lives of its readers but also in the affairs of the Smithsonian Institution—and in American journalism. SMITHSONIAN has endeavored to offer perspective on the turns and twists of history, on achievements in the sciences and arts, on the profound beauty of nature, on society's problems, on human progress of all sorts. It has attempted to reflect on our home planet, the prehistoric world and the farthest reaches of the universe.

Those are lofty ambitions, but they have been achieved with considerable success. More than 5,500 articles have appeared in SMITHSONIAN, or easily some 10 million words, and at least 40,000 photographs. Stacked side by side, a complete set of the magazine stretches 12 feet. The magazine's writers, photographers and editors choose each story, each picture and each word to illuminate what's startlingly new or everlastingly significant or undeniably entertaining, always with readers' interests in mind.

From the time that a pre-publication announcement proclaimed that the magazine would "probe Man's disasters and . . . join the battle for his improvement," it has tried to focus on people and events that matter. That is what the magazine has most in common with the Smithsonian's museums, research centers and scholars. SMITHSONIAN was never intended to be *about* the Institution, though it does cover goings-on here, but rather *of* the Institution. By reaching out to more than seven million readers each month, the magazine is especially effective at fulfilling founding benefactor James Smithson's charter to increase and diffuse knowledge.

Last month's issue, for instance, featured articles about Henri Matisse, the debate about oil drilling in Alaska, the restoration of Rome, animal camouflage, the Dead Sea, Andrew Jackson and breeding bananas. Such variety, however much it entices readers, does present a challenge for SMITHSONIAN's publisher, because the magazine doesn't fit into any conventional marketing category. But eclecticism is a SMITHSONIAN hallmark, along with high quality, which is evident from the loyalty of our readers and the awards and other professional distinctions that the magazine has earned over the years for its writing, photography and design.

SMITHSONIAN helps achieve James Smithson's goal of increasing and diffusing knowledge in other ways as well. The magazine, part of Smithsonian Business Ventures since the enterprise group was formed in 1999, has consistently been a major source of financial support to the Institution, providing over the decades hundreds of millions of dollars for Smithsonian research, exhibitions, collections and other initiatives.

Another way of gauging the magazine's success is to recall how it has shaped events. There are numerous indications that the world would indeed be a somewhat different place if not for SMITHSONIAN. Wildlife protections have been strengthened, historic buildings saved, artists and performers celebrated, the needs of struggling cultural organizations brought to the public's attention and lands and artifacts preserved at least in part because of the magazine's stories.

428 issues: the first, April 1970, and current, November 2005.

Magazine staffers receive about 500 letters and e-mails a month (and they make an effort to answer every one). Criticisms and quibbles are among the missives, and even those are welcome. But there never fail to be expressions of gratitude: "SMITHSONIAN is the only magazine whose every article I read." "In an age when shock value determines the content of many magazines, it is heartening to know that there is still a magazine out there that caters to more discriminating tastes." "I read every informative, amusing and interesting word. You can't keep that up, can you?"

The magazine surely can and will, for SMITHSONIAN, at 35, is just entering its prime.

Lawrence M. Small
SECRETARY OF THE SMITHSONIAN INSTITUTION

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LETTERS

Readers respond to the September issue:

EXERCISED

JANE ELLIOTT is an American hero ("Lesson of a Lifetime"). It's easy for people to forget the context of the times. African-Americans, who had only recently won the right to eat in any public restaurant, vote and enjoy other legally won freedoms, continued to suffer discrimination on a daily basis. Subjecting children to this exercise increased their awareness of the impact of prejudice. What better proof of the importance of this exercise is there than the positive comments made by these now grown-up children?

DARRYL ENGLE
CHANDLER, ARIZONA

JANE ELLIOTT was able to capture the essence of discrimination that lurks inside each one of us and exposed it to the world through her third-grade class. She showed us how easy it is for those in power to create and support discriminatory behavior through the simplest forms of isolation and special treatment of specific groups. And what did she get for her valiant effort to explain discrimination? Her experiment brought her notoriety and kudos from around the world and isolation in her community.

DANIEL J. SEIBERT
NEEDHAM, MASSACHUSETTS

I WAS BOTHERED by the portrayal of Jane Elliott as a heroic, iconoclastic prophet. Most of us, like Elliott herself, become tolerant citizens *without* being subjected to the psychic assault of her "lesson," which, however well intended, was animated by the disturbed logic that we must experience an evil firsthand to be inoculated against it. What future lessons based on this reasoning will be concocted to sensitize young Americans to the horrors of, say, substance addiction or familial abuse?

TIMOTHY GRIFFIN
RENO, NEVADA

LETTERS

WHEN EXPERIMENTS are performed on human subjects without their consent (or without parental consent in the case of minors), the experimenter may rationalize that a higher purpose is served. But rationalizations piled up to the moon cannot refute the basic underlying motive: a fascist mentality.

EMIL M. MURAD
HUNTINGTON BEACH, CALIFORNIA

SLAVERY IN NIGER

MORE THAN 30 years ago, as a Peace Corps volunteer in the northern portion of Chad, I discovered the very things discussed in your article about slavery in Niger, "Born Into Bondage." Slavery has been present in Saharan Africa for centuries. How tragic to hear that it still exists.

CARL MATTIOLI
NEWTONVILLE, MASSACHUSETTS

BIODIESEL BARGAIN

WHEN "FUEL FOR THOUGHT" went to press, pure biodiesel seemed expensive at $2.50 to $3 a gallon. By September, however, amidst the floodwaters of Hurricane Katrina, that cost looked like a bargain, compared with petrodiesel prices that climbed over $3 a gallon. Many Americans may now be willing to consider cheaper alternatives to fossil fuel—even recycled cooking grease. Wouldn't it be great if that new SUV smell was fried fish?

JAMIE TANG
BALTIMORE, MARYLAND

GET THE LEAD OUT

IT WAS ENCOURAGING to read in Daniel Glick's article, "Back From the Brink," that some species listed as either threatened or endangered are making remarkable recoveries. However, one correction is in order. The U.S. Fish and Wildlife Service has not "banned hunters from using lead shot nationwide." Lead shot has been banned from use only in hunting waterfowl; it is still legally used in hunting upland game such as quail and pheasant. Lead toxicity to wildlife is a serious and continuing problem and is known to affect many species, including the endangered California condor.

MIKE SMALL
GEORGE, UTAH

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November 1970

THE YEAR WE WERE BORN

A LOOK BACK AT THE WORLD IN SMITHSONIAN MAGAZINE'S FIRST YEAR

CELEBRATING 35 YEARS SMITHSONIAN MAGAZINE

Twenty-two-year-old Cincinnati Reds catcher Johnny Bench becomes the youngest man voted Most Valuable Player in the National League November 18. "This is the ultimate honor for me," he tells the *Los Angeles Times*. Bench was elected league MVP again in 1972.

WHERE ARE THEY NOW?

WILLIAM RUCKELSHAUS

FIRST EPA ADMINISTRATOR

The improved environment is "one of the country's best-kept secrets," says Ruckelshaus (in 1970) today.

WHEN WILLIAM RUCKELSHAUS saw his name listed in *Newsweek* in the summer of 1970 as a candidate to head the newly formed Environmental Protection Agency, he had never even heard of the EPA. (Officially nominated November 6, Ruckelshaus was approved by the Senate the following month.) "Starting the agency was an enormous challenge," he says today. "Many different agencies and pieces of agencies were put under its umbrella."

Ruckelshaus served as the EPA's director under President Nixon until

1973 and again from 1983 to 1985 under President Reagan. "I'm proud that the agency has survived and fundamentally done its job," he says.

Ruckelshaus, 73, lives in Seattle with his wife, Jill. He spends much of his time helping with the recovery of Puget Sound's salmon, an interest that grew out of his love of fly-fishing.

—*MIMI KIRK*

IN THE NEWS

An enormous cyclone-driven tidal wave hits the coast of East Pakistan (now Bangladesh) November 12, killing at least 150,000. Help is slow to reach survivors, prompting one of them, 36-year-old Kamaluddin Chodhury, to plead: "I do beg you to get help for us. We have no drinking water—that we need above all. But we must have vaccines . . . and we need food."

Forty-year-old Syrian Defense Minister Lt. Gen. Hafez al-Assad leads a military takeover of the government November 13. The "modest and soft-spoken" al-Assad, as the *New York Times* calls him, quickly moves to create a federation with Egypt, Libya and Sudan, which never materializes. Al-Assad's harsh rule, which lasted until his death in June 2000 at the age of 69, was known for its pan-Arab ideals and hostility toward Israel. His son Bashar al-Assad, 40, succeeded him.

THE LIST

1970 Grammy Awards

Record: "Bridge Over Troubled Water," Simon and Garfunkel
Album: *Bridge Over Troubled Water*, Simon and Garfunkel
Song: "Bridge Over Troubled Water," Simon and Garfunkel
New Artist: Carpenters
Male Vocalist: "Everything is Beautiful," Ray Stevens
Female Vocalist: "I'll Never Fall in Love Again," Dionne Warwick
Vocal Group: "Close to You," Carpenters

COMINGS & GOINGS

BORN:
Tonya Harding
Figure skater
November 12

DIED:
Charles de Gaulle, 79
Former president of France
November 9

"Every Jew wishing to be reunited with his family and people in Israel should have the right to leave Russia."

—**ISRAELI PREMIER GOLDA MEIR**, ON THE ALLEGED SUPPRESSION OF JEWISH EMIGRATION FROM THE SOVIET UNION TO ISRAEL, IN THE NOVEMBER 17 *NEW YORK TIMES*

BETTMANN / CORBIS; JACK DEMPSEY / AP / WIDE WORLD PHOTOS; RIGHT: JAMES DRAKE / SPORTS ILLUSTRATED; BETTMANN / CORBIS; ABBAS / MAGNUM PHOTOS; CHRIS WALTER / PHOTOFEATURES; STEVE DIPAOLA / REUTERS / CORBIS; DENNIS BRACK / BRUNO BARBEY / MAGNUM PHOTOS; DENNIS BRACK / IPN

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A NIGHT AT THE OPERA

WEEGEE'S WARTIME SNAPSHOT WAS WIDELY SEEN AS SOCIAL CRITICISM, BUT IT WAS, IN FACT, A FARCE **BY MATTHEW GUREWITSCH**

THE CAMERA DOESN'T LIE, people used to say, before they knew better. Arthur Fellig, the Austrian-born photojournalist who clawed his way to New York notoriety in the 1930s and '40s under the name Weegee, liked to dispense that bunkum too. "A photograph is a page from life," he wrote in *Naked City* (1945), an anthology of his newspaper work, "and that being the case, it must be real."

Well, here are some facts behind *The Critic*, shot on the opening night of the opera season, November 22, 1943, and first published in *Life* magazine and now on view in an exhibition of Weegee's work at the J. Paul Getty Museum in Los Angeles. "The Metropolitan 'first night' in the second year of the Second World War had more chi-chi than is usual in times of national—and international—stress," the *New York World-Telegram* reported. "The place was packed. The audience was a most cordial and fancily got up one, and—incidentally—the opera was *Boris Godunov*."

The spry moll on the left is Mrs. George Washington Kavanaugh, a fabulously rich and frivolous fixture of New York society who drank champagne from her slipper to titillate the *paparazzi*, though they weren't called that back then. Her friend is Lady Decies, nee Elizabeth Drexel, who married

A seemingly spontaneous encounter: All it took was some recruiting in the Bowery and a push from the photographer's assistant.

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A 1950s portrait shows Weegee in full regalia. "To all my subjects," he signed it.

Police wagon coverups (above, 1942) were all in a night's work for Weegee (below).

into the British aristocracy after burying two husbands. The first lived just long enough to sire a son of his own and then expired, presumably of tuberculosis. The second told her on their wedding night that women were physically repulsive to him and that he had married her for her money, which he then spent as fast as she would let him until his death 28 years later. (She kept up a charade of domestic bliss to protect her dear, unsuspecting mother.)

And what about the grumpy proletarian to the right? She was a Bowery boozer, lubricated by Weegee's assistant and squired uptown on Weegee's instructions. Though not in on the scheme, she glowered on cue when loosed on Weegee's prey. Unfazed in their tiaras, the ladies swept on to face the flashbulbs. The scathing social critique enshrined in this image of a seemingly spontaneous encounter is agitprop set up by the guy behind the lens.

And what a poseur *he* was. After publishing *Naked City,* Weegee amused himself with bit parts in movies, lecturing and endorsement deals. By the time he died, in 1968, of a brain tumor, his career had become something of a joke. A portrait from the '50s shows Weegee on a throne and in full regalia, puffing a cigar, camera in hand. "To all my subjects," he signed it.

One subject—our Mrs. Kavanaugh—seems to have borne him no ill will. She posed for another photographer with Weegee, along with her daughter Leonora Warner and grandson Charles G.K. Warner, known as Shot.

Shot's gifts as a raconteur have wrapped *The Critic* in yet another layer of fable. He has reportedly been in decline since 1993, when 75 friends and family members regaled him with an album of reminiscences for his 75th birthday. But in those pages, a reader meets a hugely adored gentleman, scholar, rogue, connoisseur, linguist (he studied Icelandic!), bon vivant and angler. The most popular of his stories has entered the literature, via Miles Barth's *Weegee's World.*

"Ironically, this photograph was used by the Nazis in World War II as propaganda," Barth wrote. "During the invasion of Anzio, Italy, in late 1943, Charles Kavenaugh [sic] was sitting in a foxhole when out of the skies came leaflets reproducing 'The Critic.' Inscribed underneath the image were the words, 'GIs, is this what you're fighting for?' Kavenaugh remembers being too embarrassed to mention to anyone that the woman in the photograph was his grandmother."

Not bloody likely. In his entertaining, Web-published manuscript-in-progress, *Dame Gossip*, Robert Wernick, who first met Shot in Paris in the post-victory euphoria of 1945, reports that Shot originally ascribed the incident to an old schoolmate who had been fighting in Italy. "Every time I heard the story, there seemed to be a few details added," Wernick notes, "and as I have repeated the story over the years I have added details, too."

A forensic reading of the birthday album reveals what seems like the authentic source of the anecdote. Herewith the testimony of Jack Pierrepont, who joined the National Guard as a member of the Seventh Regiment, as did Shot. They wound up in a hellhole named Camp Stewart, Georgia.

"After mail call one day Shot was seen with an unusual number of letters. Our curiosity was aroused. When the mail was opened, newspaper clippings fell all over the floor. . . . The clippings all related to the current opening of the Metropolitan Opera, where Shot's grandmother was immortalized by many photographs in her tiara, bracelets and ermine. Shot was mortified as we all hooted with delight."

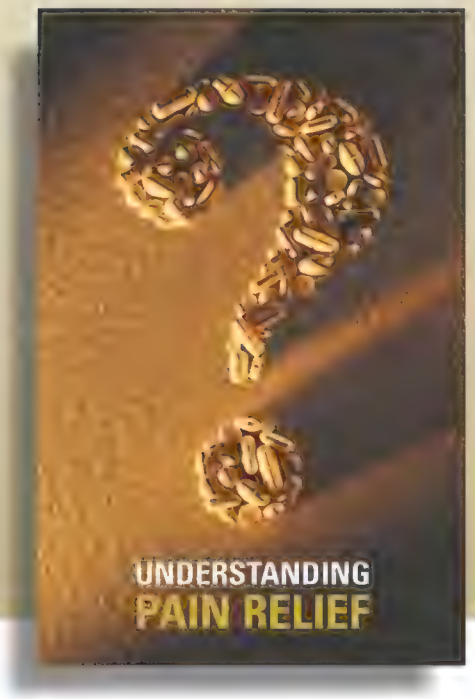
Three years later, when *The Critic* was taken, Grandmother was still up to her old tricks. On some points, the camera doesn't lie. Weegee faked it, but what a shot. Shot faked it, but what a tale.

MATTHEW GUREWITSCH writes about the arts for several leading publications.

NEW YORK DAILY NEWS; UNKNOWN PHOTOGRAPHER / INTERNATIONAL CENTER OF PHOTOGRAPHY, NEW YORK

Everybody has questions about arthritis joint pain relievers.

What you really need are answers.



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"OCIAN IN VIEW! O! THE JOY"

AFTER 4,000 MILES AND 19 MONTHS SPENT NEGOTIATING PRAIRIES, MOUNTAINS AND WHITE-WATER RAPIDS, THE CORPS OF DISCOVERY FINALLY REACHES THE PACIFIC

ONE AND A HALF YEARS *into the expedition, the corps neared the West Coast, reaching the Columbia River estuary on November 7, 1805.*

November 3, 1805 [Sgt. Patrick Gass]
The morning was foggy. . . . At 9 we proceeded on, but could not see the country we were passing, on account of the fog, which was very thick till noon when it disappeared, and we had a beautiful day. We at that time came to the mouth of a river. . . . At this place we dined on venison and goose; and from which we can see the high point of a mountain covered with snow, in about a southeast direction from us. Our Commanding Officers are of opinion that it is Mount Hood, discovered by a Lieutenant of Vancoover, who was up this river 75 miles.

November 4 [Sgt. John Ordway]
Proceeded on about 8 miles came to a large new village. . . . we bought Several dogs, and Some excelent roots nearly like potatoes. . . . towards evening we met several Indians in a handsom canoe which had an Immage on the bow. one of the Indians could talk & Speak Some words English Such as curseing and blackguard.

November 7 [Capt. William Clark]
Great joy in camp we are in *View* of the *Ocian*, this great Pacific Octean which we been So long anxious to See. and the roreing or noise made by the waves breakeing on the rockey Shores (as I Suppose) may be heard distictly. *Ocian in View!* O! the joy.

November 9 [Clark]
The water is too Salt to Drink, we use rain water.

November 11 [Clark]
About 12 oClock 5 Indians came down in a canoe . . . we are all wet as usial and our Situation is truly a disagreeable one. . . . we purchased of the Indians 13 red charr which we found to be an excellent fish . . . one of those men had on a Salors Jacket and Pantiloons and made Signs that he got those Clothes from the white people who lived below the point. . . . Those Indians are Certainly the best Canoe navigaters I ever Saw.

November 15 [Ordway]
[Private Shannon] informed us that the Savages at the village Stole two of their guns when they were asleep last night, but when Capt. Lewis went to the village they Scared them So that they gave them up again.

November 17 [Gass]
We are now at the end of our voyage, which has been completely accomplished according to the intention of the expedition, the object of which was to discover a passage by the way of the Missouri and Columbia rivers to the Pacific ocean; nothwithstanding the difficulties, privations and dangers, which we had to encounter, endure and surmount.

The captains hoped to reach the Pacific and hail a passing American ship to gain passage home, or at least send back dispatches and obtain supplies. But they found no ships and no other white men, and would have to return the way they had come—by land. Immediately, the corps set about constructing a winter camp. By a vote that included York, William Clark's slave, and the Shoshone translator Sacagawea, the corps picked a site on the Columbia estuary not far from the coast. The Corps named the winter camp Fort Clatsop, a tribute to its nearest neighbors.

Unable to preserve or season their food, six men "commenced the making of salt . . . we found it excellent, fine, strong, & white; this was a great treat."

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BREEDING SUCCESS

NOVEL REPRODUCTIVE STRATEGIES DEVELOPED AT THE NATIONAL ZOO MAY HERALD A NEW ERA IN PANDA CONSERVATION

Sure, the giant panda born this summer at the National Zoo is a celebrity, the roly-poly star of an Internet Panda Cam and the object of a frenzied naming contest. But the little guy is also a symbol of hope, because he was conceived with new techniques that scientists predict will increase captive panda populations and bolster the endangered mammal's survival in the wild.

Until recently, veterinarians have had limited success breeding giant pandas in captivity using artificial insemination. For one thing, an adult female ovulates only once a year, and vets couldn't always time the procedure just right. But Zoo researchers have greatly increased the odds by developing tools for both pinpointing the panda's maximum fertility and delivering semen more effectively.

Last February, JoGayle Howard, a reproductive veterinarian at the Zoo, began a daily sampling of Mei Xiang's vaginal cells and studied them under a microscope, looking for the orange color that indicates high estrogen levels; when the hormone peaks, an egg is released. Meanwhile, Steven Monfort, a research veterinarian, monitored the estrogen in Mei's urine. When Mei ovulated on March 10, Zoo staff released her mate, 8-year-old Tian Tian, into her pen. But the couple "tried and tried and nothing happened," says Monfort.

The next day, Howard deposited Tian Tian's semen with a fiber-optic-guided, intrauterine catheter she'd developed. The 7-year-old Mei was impregnated after one try. "We just nailed this right on," Monfort says.

JoGayle Howard (inseminating Mei in March) designed a fiber-optic catheter.

Mei's baby, a male, arrived four months later. After a Zoo-sponsored Internet contest, which drew tens of thousands of votes, the cub was named Tai Shan, meaning "peaceful mountain." He's scheduled to make his first public appearance at the Zoo this month.

Tai is part of a panda mini baby boom. Four cubs were born this summer at research centers in China, thanks to artificial insemination procedures by National Zoo-trained Chinese researchers. Panda breeding programs are also under way at Zoo Atlanta and the San Diego Zoo, where the panda Bai Yun, 13, has given birth to three cubs, including the 1999 birth of the nation's first panda cub, which was conceived by artificial insemination.

U.S. and Chinese experts hope to breed enough pandas to reintroduce them into their natural habitat in China, where their numbers are dwindling. Only about 1,600 pandas live in the wild, in bamboo forests, mostly in Sichuan Province. National Zoo officials say they expect to send the cub to a research and breeding center in China at age 2. Until then, he'll likely stay in the national spotlight.

—CHRISTINE DELL'AMORE

The panda cub (examined in August at 7 weeks by curator Lisa Stevens, left, and veterinarian Suzan Murray) had gained nine pounds since its July 9 birth.

JESSIE COHEN / NATIONAL ZOOLOGICAL PARK, S.I. (2)

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YOU SPEND YOUR LIFE
HELPING OTHERS
HAVE A FUTURE.
WE SPEND OURS
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HAVE ONE.
You see, in the end it all balances out. After all, you dedicate your career to helping others have a better life. It's only fair that following that career you should have a better life too. One called – retirement. We are TIAA-CREF and for over 85 years we've been providing long-term financial solutions specifically created for people in the academic, medical, cultural and research fields whose lifework enriches everyone. As a $340 billion financial services group with a lengthy nonprofit heritage, our mission to serve includes operating with a low fee structure, not paying commissions to our employees and mandates we work closely with you, our participants, to provide the best financial solutions to fit your life now and during retirement. It's simple really. You help our future, we'll help yours.
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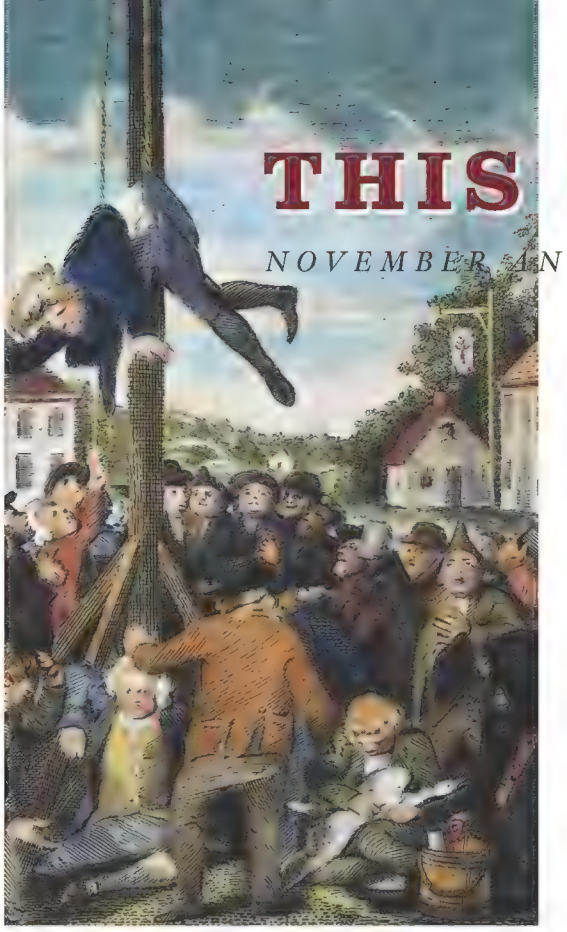
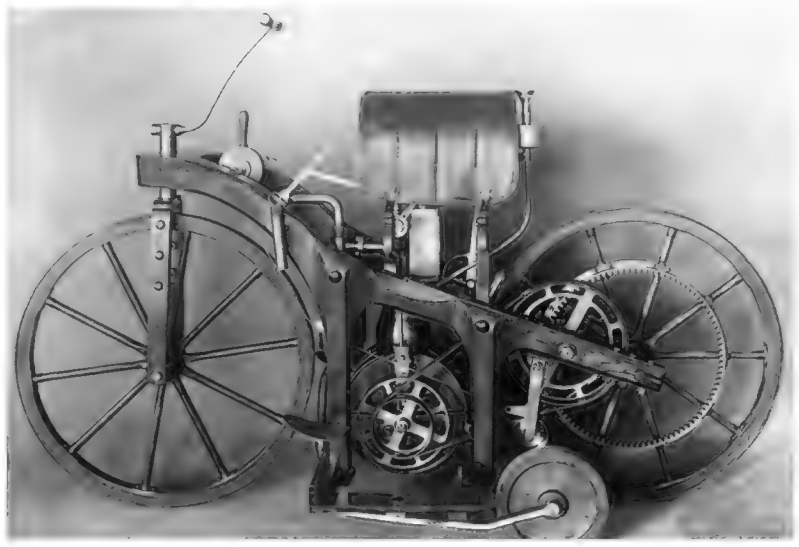
HONDA



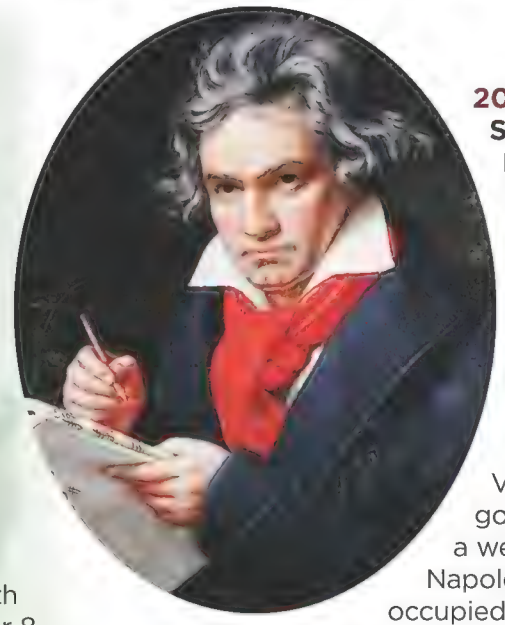
THIS MONTH IN HISTORY

NOVEMBER ANNIVERSARIES—MOMENTOUS OR MERELY MEMORABLE

120 YEARS AGO: IT'S A GAS
Internal-combustion engine maker Gottlieb Daimler demonstrates a pedal-less, gas-powered bicycle—arguably the first modern motorcycle—in November 1885. Daimler's son Paul takes the first spin, six miles down a rural road in Cannstatt, Germany. It's no easy ride: the bike, fitted with a four-stroke, one-cylinder engine, has a chassis made mostly of wood and iron-banded wooden wheels. Daimler concentrates his subsequent efforts on automobiles, founding the Daimler Motor Factory with Wilhelm Maybach (designer of the Mercedes) in 1890. Gottlieb Daimler dies in 1900.



240 YEARS AGO: RIOT ACT
The Stamp Act goes into effect in the American Colonies November 1, 1765. Passed in March by Britain to tax documents, almanacs, newspapers, cards and dice in order to pay debts from the French and Indian War, the act incenses Colonists, who protest the "taxation without representation" by petitioning, boycotting and even stringing up the odd tax agent. Parliament rescinds the act in 1766, but can't retract the spirit of revolution it unleashes.



200 YEARS AGO: SOUR NOTE
Ludwig van Beethoven, 34, conducts the première of *Fidelio*, his only opera, in Vienna, November 20, 1805. His timing is bad: most of Vienna's opera-goers had fled a week earlier as Napoleon's army occupied the city, and the tale of Leonore, a loyal wife who disguises herself as a boy to save her imprisoned husband, is a flop. The composer revises his opus for ten years, declaring it "of all my children, the one that cost me the most birth pangs . . . the one most dear to me." Beethoven dies in 1827 at age 57.

25 YEARS AGO: HOT SHOT
It is the answer to the question of the decade: after eight months of suspense, on November 21, 1980, the world finally learns "who shot J.R." Triggered by TV's most famous cliffhanger, which left J.R. Ewing (Larry Hagman) of prime time soap "Dallas" felled by bullets from an unknown assailant, 83 million Americans, 250 million viewers in 57 other countries—and bookies everywhere—tune in to see sister-in-law Kristin hold the smoking gun. It's TV's most watched show until the finale of "M*A*S*H" claims the record in 1983.

110 YEARS AGO: X-RAY VISIONARY
While experimenting with cathode rays on November 8, 1895, German physicist Wilhelm Röntgen discovers radiation rays that render many objects (his wife's hand, above) transparent, and soon realizes that a photographic plate can capture the image. Within months, hospitals are using X-rays, as Röntgen calls them, to see broken bones. Röntgen wins the first Nobel Prize in Physics in 1901.

140 YEARS AGO: CURIOUSER AND CURIOUSER
Mathematician Charles Dodgson, 33—a.k.a. Lewis Carroll—publishes *Alice's Adventures Under Ground* in November 1865. His story, first told to 10-year-old Alice Liddell in 1862, of a girl's capers with such quirky fellows as a hookah-smoking caterpillar and a mock turtle—"deliciously absurd conceptions," says a critic—is an unexpected success. Today, *Alice* is the world's most quoted book after the Bible and Shakespeare's works. Dodgson dies in 1898 at age 65.

—ALISON McLEAN

CLOCKWISE FROM TOP LEFT: GRANGER COLLECTION, NEW YORK; BETTMANN / CORBIS; ARCHIVO ICONOGRAFICO, S.A. / CORBIS; SIR JOHN TENNIEL / GRANGER COLLECTION; W. RONTGEN / GRANGER COLLECTION; EVERETT COLLECTION

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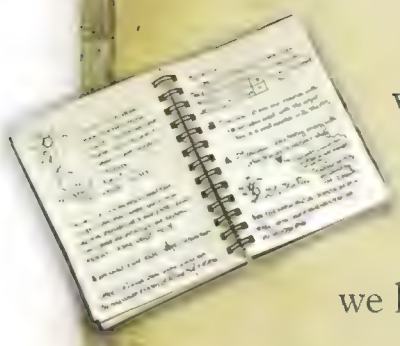

When we started working on HIV two decades ago, we had no idea what we were up against. Even with thousands of scientists using the world's most advanced technology, it still takes about 15 years and $800 million just to develop one new drug. HIV requires several. Some people say drug research is too expensive, but when you consider our astounding accomplishments with pediatric HIV, and all the children we've helped to save, it's worth it.

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INNOVATORS OF OUR TIME

We mark SMITHSONIAN's 35th anniversary by revisiting scientists, artists and scholars who've enriched the magazine—and our lives

EVERY GENIUS, said the Danish writer Isak Dinesen, is doomed. She meant that geniuses, or those touched with a spark of it, had very little choice in life. Each one, she said, was powerless "in the face of his own powers," compelled to follow a certain path and to do a particular thing with instinctive flair and originality, whether that meant being a master chef, an inspired writer of poetry or an astronomer unraveling the secrets of the stars.

Genius is an overused word these days, but it may not be too strong a label for many of the figures marching through our pages this month. All have been chosen for inclusion because what they do—or what they have done—has made a difference. And a contribution. Each has been here before to enliven SMITHSONIAN; most continue to enrich our lives by their work; all will doubtless inspire future generations by their example.

They are a varied lot, reflecting the diversity of America and the wide-ranging interests of SMITHSONIAN. They come to us from Civil War battlefields and the African bush, from the ravaged streets of New Orleans and the mountain observatories of California, from the Broadway stage and the Amazonian forest, from the corporate boardroom and the forensic laboratory. They sing arias. They scrutinize ants. They create memorable movies and singular buildings. They work magic with the instruments of their choosing—trumpets, cellos, cameras, paintbrushes, laptops and imagination. One sits awake writing poetry in the wee hours; another sorts through old bones to shed light on the advent of humans in North America; another has spent his professional life deep in the ocean, pursuing an elusive monster he has yet to find alive.

At least Captain Ahab had *seen* Moby-Dick.

Like that famously obsessive captain, the men and women we celebrate here have set out on bold missions of their own, forging ahead in the face of conventional wisdom—and often the advice of friends or colleagues—to pursue the work they love. They are all rebels of a sort. Some, like the noted scientist Edward O. Wilson and the natural historian David Attenborough, have simply extended the interests they pursued as children, seemingly without a moment's doubt about what they were meant to do. Others have piled one distinguished career atop another, as Richard Leakey has done, morphing from paleontologist to conservationist, politician, civil servant and popular lecturer with hardly a pause for breath. One of our writers, whose byline will be familiar to every reader, has run through enough careers—nuclear engineer, peanut farmer, governor, president of the United States, cabinetmaker, Nobel laureate, author—for several lifetimes.

From either side of the byline, we take inspiration from such people—explorers of the spirit, rebels with a cause, each doomed by his or her particular genius to show us the high road into new territory.

—The Editors

Wynton Marsalis

In Katrina's aftermath, the trumpeter has rallied support for his native New Orleans / **BY TOM PIAZZA**

"We're blues people. And blues never lets tragedy have the last word." This is an utterly characteristic statement by Wynton Marsalis, the trumpeter, composer and jazz impresario. He spoke those words in a television interview shortly after Hurricane Katrina devastated his hometown of New Orleans. Within days he was playing in gigs to raise money for Katrina victims, including a huge benefit concert, "Higher Ground," produced by Jazz At Lincoln Center, of which he is the artistic director. It has raised more than $2 million. Bob Dylan once remarked that a hero was "someone who understands the degree of responsibility that comes with his freedom." By that measure, Marsalis is a hero bona fide.

From the time he first came to wide public attention at age 18 with Art Blakey's Jazz Messengers, in 1979, Marsalis has thought deeply about what it means to be a jazz musician. Although his brothers Branford, Delfeayo and Jason are musicians, and his father, Ellis Marsalis, is a prominent jazz pianist, Wynton had to come to jazz on his own terms. "When I was growing up," he once told me, "jazz music was just something that my daddy played that nobody really wanted to listen to. I didn't listen to it because it was 'something old.' A little later, once I started to want to check jazz out, I was really the only one I knew who wanted to play it."

After leaving Blakey's group, Marsalis spent a decade and a half touring with his small ensemble and, later, the Lincoln Center Jazz Orchestra, playing concerts, lecturing, visiting schools. His tours were part old-fashioned traveling lyceum, part portable revival meeting, and he planted the seeds of a new generation of musicians. They've had their careers, and often their lives, cultivated by Marsalis, who called them from the road, urged them to practice, suggested recordings for study and in time offered them gigs.

> Marsalis would finish a concert and sit up into the early morning hours composing. . . . [then] call from Paris, London, Zurich, Hamburg to demonstrate the piece on horn and piano. –SMITHSONIAN, SEPTEMBER 1992

Marsalis has made some 60 recordings and written five books, and he has won nine Grammy Awards for his classical trumpet recordings as well as his jazz efforts. He was the first jazz composer to win the Pulitzer Prize for Composition, for his oratorio "Blood On The Fields," in 1997. He has attracted more attention from the mainstream arts establishment than any jazz musician since Duke Ellington, and Marsalis has used the vast resources at his disposal to establish the premier jazz educational and performance venue in the world, Jazz At Lincoln Center, in New York City.

Of course, anyone in such a position attracts criticism the way a statue attracts pigeons. Unlike some who see jazz solely as a music for iconoclasts, Marsalis has advocated an approach based on a solid grasp of the music's history and traditions. Reviewers and musicians who disagree with him have sometimes been bruised by his bluntness. Yet the jazz world has gotten more used to Marsalis' large presence. While there are still some people who would carp if Marsalis gave eyesight to the blind, even his critics have conceded the value of the enormous public visibility and credibility he has brought to jazz music.

In his cosmology, Marsalis has always located not just the roots but the heart of jazz in New Orleans. He has been involved with summer programs for young musicians in the Crescent City and has privately helped individual musicians financially and professionally. The devastation brought to New Orleans by Hurricane Katrina clearly has pained him deeply. He's involved in what promises to be extended wrangling over New Orleans' future, participating in planning meetings with political, business and civic leaders, all of whom have different visions of what a reconstructed city might become. Marsalis insists on including in that vision the city's poorest residents, so often the bearers of its musical, culinary and spiritual culture at the deepest level.

"We're not going to just fade away because of a crisis," Marsalis said in a September TV interview. "That's not in our nature." It's certainly not in his. He has used his talents, and his understanding of the responsibility that goes with them, to become deeper, more human, more valuable.

TOM PIAZZA, of New Orleans, is author of Understanding Jazz *and* Why New Orleans Matters *and the novel* My Cold War.

JOS L. KNAEPEN

Jazz, says Marsalis (in Marciac, France, in 2004), is a melting-pot art form with world appeal that embodies the American spirit.

Margaret Burbidge

Stars, quasars, supernovae, galaxies—if it's out of this world, she has seen it / **BY MARCIA BARTUSIAK**

One of the most important discoveries in modern astronomy was published in the *Reviews of Modern Physics* in 1957. Astronomers refer to the paper as simply B^2FH, from the initials of the authors' surnames. The first B refers to E. Margaret Burbidge.

The scientific journal article opens with a quotation from Shakespeare: "It is the stars, the stars above us, govern our conditions." The words, from *King Lear*, are certainly appropriate. Burbidge and her colleagues—Geoffrey Burbidge (her husband), William Fowler and Fred Hoyle—had provided a map of the routes by which elements heavier than hydrogen and helium are forged within the fiery bellies of the stars. The calcium in our bones, the iron in our blood and the oxygen we breathe all came from the ashes of ancient stars, which had either exploded as supernovae or died slowly, releasing their matter into space.

Margaret Burbidge's colleagues worked on theory and laboratory experiments; she employed the telescope, seeking direct evidence from the heavens. Others had speculated about the origins of elements, but B^2FH delivered the proof.

Burbidge first became aware of the stars 82 years ago, at the age of 4. The young Eleanor Margaret Peachey beheld them with vivid clarity during a nighttime crossing of the English Channel. Upon starting her studies at University College, London, in 1936, she discovered to her delight that astronomy could be a career as well as a hobby. Wartime blackouts, which kept the urban sky dark, allowed her to carry out research on the outskirts of London, using a telescope so antiquated that it was moved by a hanging weight.

> "It's a bit like playing chess with nature as your opponent. You make a good move, but nature counters with half a dozen new ones." —MARGARET BURBIDGE, SMITHSONIAN, JANUARY 1974

After the war Peachey got married. She was eager to seek out the best telescopes and the best skies for observing, so she and her physics-trained husband, her closest collaborator over the years, moved to the United States. They eventually settled in California, where she began her lifelong commitment to opening up opportunities for women in science. At a time when women weren't allowed to use the telescopes (or even stay overnight in the observatory's dormitory), she fought for—and won—access to those atop Mount Wilson near Pasadena. "Thanks to her influence," Caltech astronomer Anneila Sargent has said, "women can observe at any American observatory." Burbidge puts it simply: "If you meet with a blockage, find a way around it."

Verifying that we are composed of stardust was the first in a long list of achievements. Burbidge made pioneering measurements of the masses of galaxies and specialized in quasars. These celestial entities are believed to be luminous objects at the centers of galaxies, where a spinning, supermassive black hole generates tremendous radiation. For many years she held the record for finding the most distant quasar, a feat listed in the *Guinness Book of Records*.

Burbidge returned briefly to Great Britain in 1972 to serve as the first female director of the famed Royal Greenwich Observatory. But, happier at a telescope than a desk, she soon returned to the University of California at San Diego, where she studies quasars that emit large amounts of X-rays.

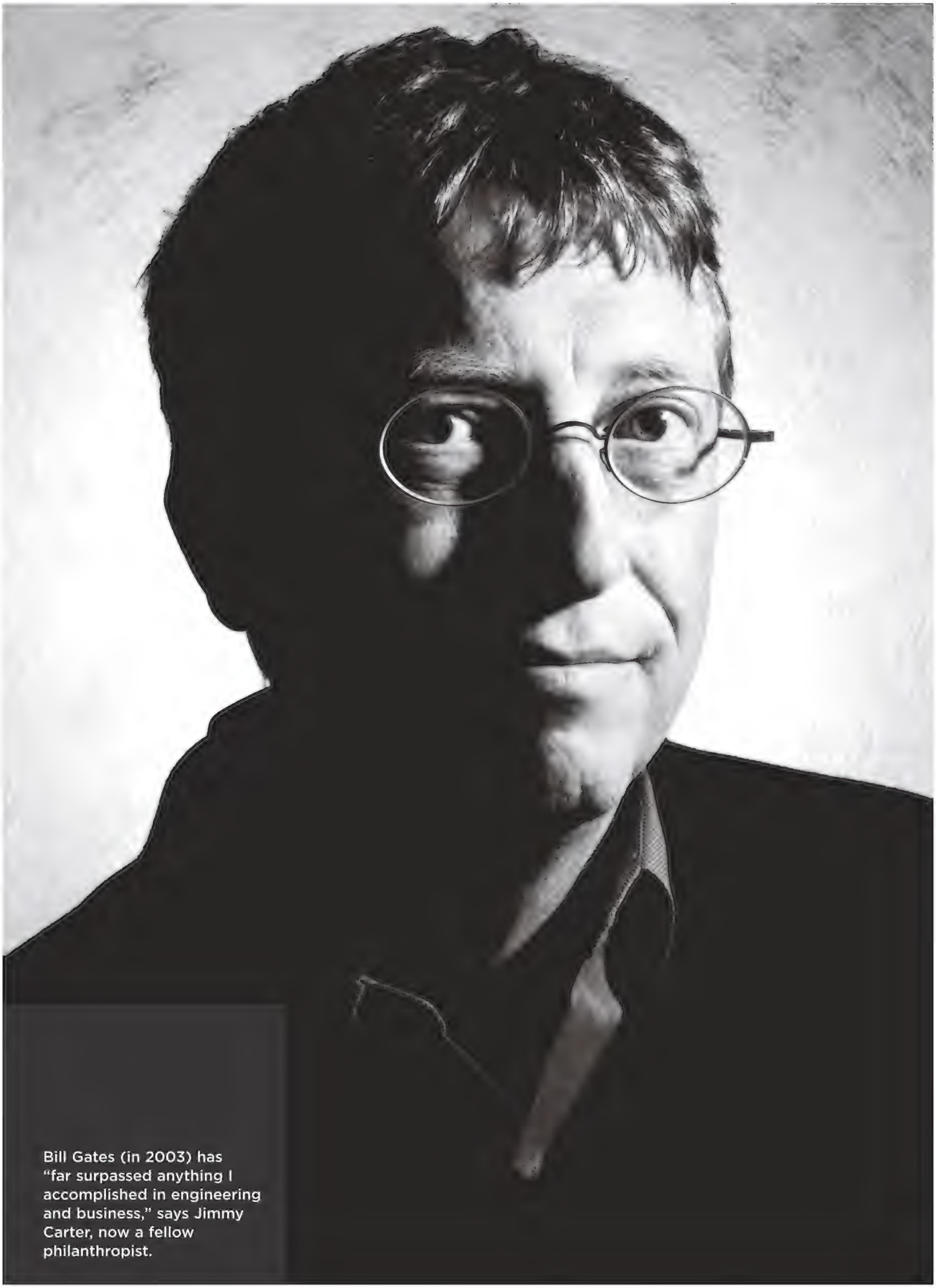
She has not always embraced the majority opinion on celestial matters. Both Burbidges suspect that the true nature of quasars has not been fully revealed and that quasars are closer to us than most astronomers assume. In a 1994 memoir, she says that she is "continually surprised by the almost religious fervor with which most astronomers demand a single 'Big Bang' act of creation for the Universe." Burbidge is more attracted to the notion, introduced by Hoyle, that matter was created in successive epochs, not just by a single event. Her unconventional views have often spurred the astronomical community to new lines of research.

Burbidge has devoted nearly 70 years to keeping watch on the universe. Unlike today's astronomers, most of whom sit in control rooms watching data displayed on monitors, she has had the pleasure of sitting directly at a telescope. "To ride with the telescope," she once recalled, "was an experience I wish I could share with today's generation. . . . One could look out at the spectacular vision of the heavens." She has held a front row seat on a golden age of astronomy.

MARCIA BARTUSIAK's most recent books are Einstein's Unfinished Symphony *and* Archives of the Universe.

FIELD ENTERPRISES

Burbidge (in 1973 at the Lick Observatory near San Jose, California) verified the cosmic theory that human beings are made of stardust.



Bill Gates (in 2003) has "far surpassed anything I accomplished in engineering and business," says Jimmy Carter, now a fellow philanthropist.

Bill Gates

The king of software takes on his biggest challenge yet / **BY JIMMY CARTER**

As a former engineer and businessman, I've long admired Bill Gates' innovative entrepreneurship: while we share a high regard for the vision it takes to achieve far-reaching goals, he far surpassed anything I accomplished in engineering and business. He sees how the world can be made better with the strategic and daring use of time, talent and resources.

Through the Bill & Melinda Gates Foundation, Bill has brought the same far-sighted approach to public health challenges in the developing world as he did to computer technology. Just as he changed the landscape of electronic communication, his foundation is reshaping the landscape of deadly and debilitating diseases in the developing world. Someday, this may be his greatest legacy.

I first met Bill and his wife, Melinda, in 2000 at their foundation's original, low-key offices in Seattle. As I usually do in an initial meeting with a new acquaintance, I described in detail the work of The Carter Center in the many poor and underdeveloped countries where we operate. It was quickly obvious that Bill knew as much as or more than I did about many of these countries and that he fully understood the devastating impact diseases had on their citizens. This was my first insight into how much he cared about the underprivileged around the world and how much knowledge he could absorb and retain. I knew then I would have a friend and ally in helping the world's most forgotten people.

He has expressed great concern that as little as 10 percent of medical research is devoted to diseases that cause perhaps 90 percent of the world's health problems, such as tuberculosis, HIV/AIDS, malaria and various intestinal maladies. Bill believes that with the right mix of funding and innovation his foundation can achieve breakthrough results in this battle.

> Gates' arrival is followed by a moment of homage during which affluent spectators joyfully salute the world's richest man.
> –SMITHSONIAN, AUGUST 2001

In fact, since making its first global health grant in 1998, the Gates Foundation already has made a huge impact. It has helped save the lives of more than 670,000 children in the developing world through its support of an aggressive vaccination program. Yet Bill has set his sights much higher: preventing the deaths of millions of children a year. Such a goal requires new ideas, so his foundation offers grants to stimulate fresh thinking—for example, to try to come up with vaccines that need no refrigeration, or to try to alter the genetics of mosquitoes to kill or render them incapable of transmitting diseases such as malaria.

As a risk-taker, Bill is not afraid of failure. For example, those of us concerned about global health became excited in the late 1990s about the potential use of microbicides in the prevention of HIV/AIDS, which women could use to protect themselves even if their partners refuse to use condoms. However, a study in 2000 found that an early microbicide candidate, Nonoxynol-9, may actually increase the risk of HIV. The Gates Foundation responded to this setback by providing a $60 million grant in 2002 to push continued research and testing to overcome the problems in the early study, and today there are a number of promising microbicide candidates in development.

Bill sees his foundation as a catalyst, and he and Melinda carefully choose where to make grants that will have the greatest impact. For example, the foundation's $1.5 billion commitment to the Global Alliance for Vaccines and Immunization (GAVI) has not only enabled the organization to reach more than 80 million children with lifesaving vaccines, it has also helped GAVI raise significant new funding from other donors. In September, five European governments announced nearly $4 billion in new funding for GAVI over the next ten years. These donors, and others, are responding not only out of hope; they're also responding to Bill's track record in business and his increasing success in the global health field.

Bill's business instincts steer his foundation's direction. He knows what will motivate manufacturers to produce vaccines and medicines with limited commercial potential—limited because they target diseases plaguing primarily poor people. These manufacturers want reassurance that a distribution system will be in place once their investments in new vaccines emerge from the pipeline. He gives them that as-

Former president JIMMY CARTER, co-founder, with his wife, Rosalynn, of The Carter Center, won the Nobel Peace Prize in 2002.

BRIAN SMALE

surance—by sufficiently funding a program for a long-term commitment, by promoting long-range planning in countries that will benefit from the medicines, and then by helping these countries build a public health infrastructure.

Our two organizations mesh well in the programs we've undertaken jointly. We share a view that health interventions can have a multiplier effect on societies. Keeping people alive and healthy is a worthy goal in itself, but good health also keeps more children in school and farmers in their fields, which promotes a more active community life and a stronger economy. Sustainable economies require less financial assistance and, foreseeably, put an end to dependency.

While a major focus of the Gates Foundation's work has been delivering and developing vaccines, the foundation also supports The Carter Center's efforts to eradicate Guinea worm disease, which needs no vaccine. I've been impressed with Bill's understanding of what it takes to end that extremely disabling disease, caused by a parasite ingested in impure drinking water. Most business people want quick results, but stopping the transmission of the Guinea worm larvae to other human hosts takes time and is rife with uncertainty. Although we've reduced the number of cases by more than 99 percent to just 7,000 victims so far this year, who are mostly in two African countries, Ghana and Sudan, the last cases are the most crucial, difficult and costly to contain. Bill has translated his vision and optimism into tangible support for the eradication effort and challenged others to join him.

The foundation is also helping The Carter Center to realize the goal of eliminating river blindness disease from Latin America in this decade. River blindness is caused by parasites left by the bites of small black flies that breed in rapidly flowing streams; the parasites infect a victim's eyes, often leading to blindness.

In this case, medicine is the answer. We've determined that treating 85 percent of the half-million people at risk in the Americas with semiannual doses of ivermectin will halt transmission of the disease.

Bill likes the payoff from this initiative. But I would hate to imply that it's only Bill's intellect and business sensibilities that drive his philanthropy. It's his heart. "I believe the death of a child in the developing world is just as tragic as the death of a child in the developed world," I've heard him say. And if we can make sure that all people, no matter what country they live in, have the preventive care, vaccines and treatments they need to live a healthy life, he says, "it will be the best thing humanity has ever done." He adds: "I believe we can do this."

Bill and Melinda's foundation has set a major change in motion, elevating the potential of public health research and policy to improve life on earth. It has energized research into global health, made that work a credible career choice and attracted politicians to the cause. Perhaps most important, the confidence Bill has brought to the field has stimulated much more funding. As a result, we can see a day when sufficient resources are applied to global health to prevent the suffering and deaths of tens of millions of people.

Mark Plotkin

An ethnobotanist takes up the cause of rain forest conservation / **BY ELIZABETH ROYTE**

MARK PLOTKIN first stepped into the Amazon jungle in 1978. A college dropout working at Harvard's Museum of Comparative Zoology, he had been invited to join an expedition to search for a rare crocodilian. By the time SMITHSONIAN reporter Donald Dale Jackson caught up with him in the Suriname rain forest a decade later, the 33-year-old scientist, now a Tufts PhD, was documenting the Tirio Indians' use of medicinal plants and was well on his way to becoming one of the nation's best-known ethnobotanists and conservation activists. Since that story appeared, in 1989, says the intrepid—some might even call him gonzo—plant explorer, "a lot has happened."

Today, he says, "indigenous wisdom is appreciated in ways it wasn't before. There's an interest in other religions, in spirituality, organic gardening, crop diversity, rain forest conservation, human rights. It's all intermingled." As evidence of ethnobotany's new status, he cites a *Wall Street Journal* cartoon in which a man pushes his way through gawkers at an accident scene, hollering, "Let me through, I'm an herbalist!"

From his very first visits to indigenous villages, Plotkin understood that shamans—tribal elders who use plants for healing—were actually the rain forest's most endangered species. Not only were tropical forests and their medicinal plants falling to the rancher's torch, miner's pick, or farmer's plow, but shamanic wisdom itself was disappearing as younger tribal members, seduced by Western culture, lost interest in their own traditions. In 1993, Plotkin published *Tales of a Shaman's Apprentice*, a chronicle of his own swashbuckling adventures in the jungle as well as a call to preserve nature's pharmacopeia, with its untapped promise for curing disease. Now in its 25th printing, *Tales* has been translated into five languages and has been adapted into a video, audiotape, children's book and IMAX film.

Convinced that rain forest conservation wasn't going to succeed without the full participation of indigenous people, in 1995 Plotkin and his wife, Liliana Madrigal, founded the Amazon Conservation Team (ACT) to create such partnerships. "Our approach is bottom up," he

ELIZABETH ROYTE is the author of The Tapir's Morning Bath, *an account of rain forest scientists at work in the field.*

Plotkin (in Suriname, with Amashina, a Tirio shaman, in 2005) believes that "indigenous wisdom is appreciated in ways it wasn't before."

says. "Tribes come to us. They want to protect their forest, culture, system of healing. They want clean water, job opportunities, ethno-education."

It's a tall order for a $3 million operation working out of a second-floor walk-up located above a kebab shop in Arlington, Virginia. Still, ACT has mounted a highly successful flagship program, Shamans and Apprentices, which helps healers share medicinal knowledge with tribal members of the next generation. So far, shamans have trained 70 apprentices in Suriname and Colombia. ACT has also established clinics in southern Suriname run by tribal healers using traditional medicines and has taught 18 tribes in Suriname and Brazil how to use Global Positioning Systems to map some 29.5 million acres—a major step toward more effective management of their ancestral lands.

> "The first time I came here I thought I'd found paradise. I still think it's as close as we're apt to get."
>
> –MARK PLOTKIN, SMITHSONIAN, FEBRUARY 1989

Plotkin dismisses both "pinheads who say extinction is natural" and critics who ask why he won't publish the chemical compositions of beneficial plants. "They are the Indians' secrets: Why should *I* publish them?" He is especially proud of an effort he undertook as a graduate student: creating, translating and handing over to the Tirio a handbook on their own medicinal plants. (Before then, the tribe had only one other book written in their language: the Bible.)

In his spare time, Plotkin has been writing a field guide to the lianas (climbing vines) of Suriname and developing an ethnobotanical explanation for why jazz originated in his native New Orleans. (It has to do with the arrival of marijuana in that port city.)

As media focus has shifted, rain forest conservation no longer generates the headlines it once did. "But there is a direct link between environmental degradation and political uncertainty," Plotkin insists. "Look at Haiti and Rwanda. They're overpopulated, their forests are gone and they're politically unstable. The world is an ever-smaller place. Environmental protection everywhere concerns us, because of potential medicines in plants and animals, climate change, the impact of pollution, human misery. So I ardently reject the idea that the rain forest has had its day."

He pauses to consider his personal trajectory, recalling his mentor Richard Evans Schultes, the renowned Harvard ethnobotanist. Plotkin's epiphany took place at a Schultes slide show of indigenous people. "It was blowguns, botanical potions, healing in the spirit realm," says Plotkin. "And I thought, 'How cool is that?' It really got the blood of a 19-year-old racing." He pauses, perhaps considering his recent 50th birthday, then adds, "You know, it's racing still."

AMAZON CONSERVATION TEAM

Richard Leakey

The leader of the Hominid Gang asks what he can do for his continent / **BY VIRGINIA MORELL**

As a child, Richard Leakey spent many hours—too many, in his opinion—broiling in the sunbaked hills of western Kenya while his famous parents, Louis and Mary, picked away at fossils. "I'm afraid I was a whiny child," he says. After one "I'm tired, I'm bored" lament, his exasperated father shouted, "Go and find your own bone!" The young Leakey did exactly that, of course, and discovered a satisfyingly large jawbone—the beginning of what would be the most complete remains of a certain species of extinct pig then known. Richard Leakey was 6.

"My parents took over the excavation as soon as they saw what I had," he recalls. But he later led numerous fossil-hunting expeditions of his own, pursuing, as had his parents, humankind's most ancient ancestors. And despite his lack of a university education, he and his team of Kenyan fossil hunters (the famed Hominid Gang) hauled in everything from the fossilized remains of 17 million-year-old early apes to a nearly complete *Homo erectus* skeleton. "I'd spent most of my life groveling in the sediments," Leakey says, "so I had a fairly good idea of how to go about finding these things."

Now 61, Leakey has the weathered look you'd expect of a man who has spent much of his life in the field and the manner of a man used to being in charge. At dinner during a recent visit to San Francisco, he smiled when a waiter apologized for stepping on his foot. "No need," said Leakey. "It's metal."

While piloting his plane on a government mission 12 years ago, he went down in the mountains outside Nairobi; both his legs were subsequently amputated below the knees. The accident surely would have ended his fossil-hunting career, but by then he'd already accepted an appointment from then-president Daniel arap Moi to head Kenya's troubled conservation department. His success at stemming elephant poaching, he believes, may have led someone to sabotage his plane.

But Leakey's crash failed to dampen his determination. He had, after all, already survived a terminal kidney disease he'd contracted in his early 20s. "I had two legs in the grave, but I wasn't dead," he says. By the time of his accident, he had put in nearly 30 years as a civil servant and director of the National Museums of Kenya, and he had become increasingly appalled by corruption in Moi's regime. After forming a new political party, Leakey was appointed a member of Parliament; then he forged alliances to rewrite Kenya's constitution and worked to introduce legislation concerning rights for the disabled.

In 1999, Moi asked Leakey to return to his inner circle as his permanent secretary and head of the Public Service, which oversees government workers. Hoping to persuade Moi to clean up his government, Leakey agreed and succeeded enough for the World Bank and International Monetary Fund to restore financial aid to Kenya. But recognizing the limits of public office, Leakey stepped down in 2001.

"I'm still waiting for the perfect job," he says with a smile.

His late mother credited "the missionary spirit" for his drive—the same trait that compelled Richard's grandparents to move to Kenya from England as missionaries in the early 1900s. "Richard inherited those genes, I think, that need to inspire," she once told me. In his spare time, Leakey has worked on behalf of Kenya's kidney patients and, with his wife, the paleontologist Meave Leakey, helped finance the education of numerous Kenyan graduate students.

When I met up with him, Leakey was passing through California after giving a speech about global warming and was headed back to Nairobi to meet with former president Bill Clinton on AIDS treatments. He is planning a Web-based foundation to assist Africa's ailing national parks, and he's started to raise funds to build a private hominid research institution in Kenya.

"I'm still keenly interested in what makes us human," he says. "I'd like to know when and how humans first left Africa and what events—cultural and physiological—made us into modern humans." His home, vineyard and family remain in Africa—as does his heart. "I'm deeply motivated to make the African continent work, to give back to Africa, since so much has been taken from it," Leakey says.

"[To] argue for inbuilt aggression in *Homo sapiens* [is to] see aggression as a universal instinct. . . . It is no such thing."

–RICHARD LEAKEY, SMITHSONIAN, NOVEMBER 1977

VIRGINIA MORELL is the author of Ancestral Passions: The Leakey Family and the Quest for Humankind's Beginnings.

CHRISTOPHER CORMACK / CORBIS

"I'm deeply motivated to . . . give back to Africa, since so much has been taken from it," Leakey (in 1980) says.

Annie Leibovitz

Her elegant portraits take celebrity photojournalism to quirky new heights / **BY SARAH BOXER**

SOME PEOPLE know how to look good in a photograph. Some do not.

Annie Leibovitz makes them all look good: Whoopi Goldberg grinning in a warm milk bath, Demi Moore nude and pregnant, Susan Sontag with skunk-striped hair, shirtless Jerzy Kosiński in riding boots, Bette Midler in roses, Keith Haring in nothing but his own graffiti, Steve Martin painted up like a Franz Kline, Miles Davis fingering his tongue, Keith Richards passed out, Clint Eastwood bound like a steer, Meryl Streep pulling her rubbery white face, Hillary Clinton queenly in red, Sting nude, Divine in a bra.

You never have to wonder about the significance of a Leibovitz portrait. It's right there on the surface. She always manages to choose a setting, a pose and a costume that will puzzle no one. That may be why, for many celebrities, the Leibovitz photograph is *the* photograph, the one that will follow them to the grave. Leibovitz's most famous portrait shows a nude John Lennon clinging to a clothed Yoko Ono, hanging on for dear life. It was, as Leibovitz once noted, "definitely an image I saw before I took the photograph." Lennon liked it. "That's us," he told her when he looked at the Polaroid. "That's our relationship." He was killed hours later.

Leibovitz, born in 1949 in Waterbury, Connecticut, to Samuel Leibovitz, an Air Force colonel, and Marilyn Leibovitz, a modern dance instructor, studied painting at the San Francisco Art Institute. In 1969, while living on a kibbutz in Israel, she got a subscription to *Rolling Stone* from her boyfriend. She remembers thinking, "If I could just work for this magazine. . . . "

> Leibovitz has forged a lively and highly personal style that has framed, and to some extent shaped, the look of American popular culture.
> –SMITHSONIAN, JULY 1991

She could, and did, from 1970 to 1983, evolving from a photographer of celebrities to a plain old celebrity herself. Her first assignment was to photograph Grace Slick, Jefferson Airplane's lead singer. Back then, she remembers, "I believed I was supposed to catch life going by me—that I wasn't to alter it or tamper with it." The photographers to copy were Robert Frank and Henri Cartier-Bresson. She did not copy.

Instead, she learned how to be totally subjective, first in black and white and later in saturated color. Her bold, highly staged pictures were shaped by their goal—to stand out on the cover of a magazine. But her eye never got weird or mean. "A thing that you see in my pictures is that I was not afraid to fall in love with these people," she once said.

Leibovitz has often let her subjects call the shots. Louis Armstrong, knob-kneed in shorts, socks and slippers, got to leave the TV, and the ballgame, on. Diane Keaton pulled a white turtleneck up over her face because she didn't like the camera. But somehow Leibovitz also has gotten her way. Performance artist Karen Finley wanted to preserve her nudity for the stage; Leibovitz wanted to preserve it for posterity. Leibovitz won.

For the camera, Leibovitz has coaxed so many men out of their shirts that Tom Wolfe, whom she has photographed in tie, jacket and hankie, once mused: "Why are so many celebrities willing, even desperate, to take their shirts off for the photographer?" Maybe it's because they trust her.

In 1983, Leibovitz had her first solo exhibition, published her first book and left *Rolling Stone* to become *Vanity Fair*'s first contributing photographer. She didn't worry about competing with the grand men of fashion photography: Cecil Beaton, Irving Penn and Richard Avedon. "I had to find my own form of glamour," she said.

Never far from commercial, she went all out in 1987 for an American Express ad campaign, offering up some of her finest subjects: Ella Fitzgerald in red next to her 1959 Mercedes convertible, Sammy Davis Jr. dancing in the desert, Tip O'Neill in a beach chair, bare-chested Arnold Schwarzenegger on a white stallion. Her artistic reputation did not suffer. In 1991 the National Portrait Gallery in Washington, D.C. and the International Center of Photography, in New York City, gave her a museum show.

The secret of Leibovitz's success may be her devotion to photography as theater and her deep belief in the truth of appearances. "Sometimes I enjoy just photographing the surface," she has said, "because I think it can be as revealing as going to the heart of the matter."

SARAH BOXER writes about the arts for the New York Times *and is the author of* In the Floyd Archives: A Psycho-Bestiary.

ELLIOTT ERWITT / MAGNUM PHOTOS

"I realized that you can't help but be touched by what goes on in front of you," Annie Leibovitz (in New York City in 2004) once said.

Clyde Roper

He's spent his life chasing a sea monster that's never been taken alive / **BY RICHARD ELLIS**

CALL HIM AHAB. Or call him lucky. While the whale-obsessed captain of the *Pequod* was done in by the great white sea monster, Clyde F.E. Roper has remained remarkably intact, even as his pursuit of another legendary leviathan has taken him around the world several times: onto the decks of storm-tossed ships, into submersibles suspended deep under the ocean's surface, onto remote beaches, and back to his laboratory at the Smithsonian's Museum of Natural History to examine battered and bruised specimens of *Architeuthis* in his lifelong quest to unravel its secrets.

Roper (in his office in 2004) once worked as a lobsterman, but his obsession is the 60-foot cephalopod known as the giant squid.

Architeuthis is, of course, the giant squid—60 feet of cephalopod with unblinking eyes the size of a human head, a parrot-like beak nestled within its eight arms and a pair of grasping tentacles that it may or may not use in its titanic battles with the sperm whale, the bane of Ahab's existence.

Roper, 68, was born in Massachusetts and raised in New Hampshire, where he worked as a lobsterman between the ages of 14 and 21—but his creatures of choice are cephalopods: octopuses, squids, cuttlefishes and the chambered nautiluses. He studied at the University of Miami under Gilbert Voss, who was then the world's top squid biologist, and he wrote his dissertation on an Antarctic species.

Roper came to the Smithsonian Institution in 1966 and has yet to leave, unless you count squid-hunting expeditions. When a dead sperm whale came ashore on a beach in Florida in 1964, Roper hacked it open with an ax to retrieve *Architeuthis* beaks; when a doctoral candidate cooked up a piece of giant squid in 1973, Roper was among those on the student's committee who tried to eat it (and found it tasted bitterly of ammonia). He has written about 150 scientific papers on cephalopod biology, and in 1984, with Mike Sweeney of the Smithsonian and Cornelia Nauen of the United Nations' Food and Agriculture Organization, he wrote the definitive *Cephalopods of the World,* a new edition of which is in the works. (Roper even turns up, thinly disguised, as "Herbert Talley, doctor of malacology," in Peter Benchley's 1991 novel, *Beast*, about a sea monster that terrorizes a Bermuda community.)

His current title is zoologist emeritus—"not retired," he is quick to point out—and he remains the world's foremost authority on *Architeuthis* even though he has yet to see a living adult. In 2004, two Japanese researchers took the first known photographs of a giant squid with a remote-controlled camera submerged 3,000 feet beneath the Pacific Ocean; the photographs were released this past September.

> He once arrived at a lecture bearing a four-foot squid . . . and inquired, "OK, who ordered the calamari?" –SMITHSONIAN, MAY 1996

"I think this is really, really exciting," says Roper of the photographs and an 18-foot length of tentacle the animal left behind, "and it's one more step in solving the mystery of the giant squid. I congratulate the [Japanese researchers]." As for devoting his career to such an elusive quest, he says he has enjoyed the chase and feels that his work—documentaries and articles, school presentations and lectures—has introduced people to this "mysterious, wonderful and real monster."

Still, Roper says he longs to see a full-grown *Architeuthis* feeding, mating or fighting off a sperm whale through his submersible's porthole. "We have the tools and the know-how," he says. "Now all we need is the squid."

RICHARD ELLIS, a research associate at the American Museum of Natural History, is the author of The Search for the Giant Squid.

CHIP CLARK / NATIONAL MUSEUM OF NATURAL HISTORY

Jane Mt. Pleasant

Iroquois tradition plus Western science equals a more sustainable future / **BY GARY PAUL NABHAN**

AMONG THE SIX NATIONS of the Iroquois, corn, beans and squash have been known as the Three Sisters—gifts from the Creator that grew well together and provided nutritional sustenance. Jane Mt. Pleasant might be considered the Fourth Sister.

Over a three-decade career as an agricultural scientist, Mt. Pleasant has revitalized interest in the ancient Iroquois tradition of growing food through polyculture, a system that allows interdependent plants to flourish. She has used it to help farmers protect their soil, and she has rescued from extinction several varieties of corn that have sustained Native communities in the Northeast and Canada for centuries. Along the way, she has blended Native knowledge and Western science to give Native Americans a strong presence in the emerging field of sustainability science.

None of which she had in mind when she was growing up in and around Syracuse, New York, or when she was dropping out of American University in Washington, D.C., in 1968, or driving a taxi in New York City for eight years. True, she has Iroquois ancestry—her father grew up on the Tuscarora Reservation near Buffalo, New York—but Mt. Pleasant did not get serious about soil until after she returned to college in the mid-1970s. She got a PhD in soil science from North Carolina State University in 1987, between degrees from Cornell University, where she is now director of American Indian studies and an associate professor of horticulture.

"Over my years of working with the Three Sisters, it has become clear to me that our lives and the lives of plants are intertwined," she says. "There is really no way that plants and people can get away from one another."

As the hazards of industrial-scale farming, such as soil erosion and toxic runoff, have become more evident, Mt. Pleasant and other scientists have shown how corn, beans and squash complement one another ecologically. (Squash vines prevent soil erosion, cornstalks provide beanpoles and bean plants fertilize the soil.) Mt. Pleasant has also investigated how corn varieties vary in their capacity to outcompete weeds and how that depends on whether they are planted alone or with the other sisters. In preserving heirloom varieties of corn, she has documented their preferences for planting dates, population density and access to nitrogen.

> "We may not be on the brink of disaster, but we can't keep using the same practices."
> —JANE MT. PLEASANT, SMITHSONIAN, NOVEMBER 1998

One result is greater credibility for the study of Native American farming systems. "There is more acceptance today of my work among some scientists," she says, "but perhaps I am more self-confident than I was when I began, as well. I'm less frustrated by the lack of interest that remains among some scientists with regard to Native American knowledge and less sensitive to their criticisms."

She has also learned to let go when necessary. When Native American farmers showed interest in renewing the corn varieties she helped preserve, she willingly phased out university involvement in the venture. But though she has seen a dramatic rise in the number of Native American farmers and gardeners growing heirloom varieties, she cites one lingering discouragement: "I run into so few young people wanting to be farmers," she says. "And in particular, it is very difficult to find Native American students that want to go into agriculture."

"There is really no way that plants and people can get away from one another," says Mt. Pleasant (in 2005, with Iroquois corn).

MIKE GRE[illegible]ENLAR

GARY PAUL NABHAN is director of the Center for Sustainable Environments at Northern Arizona University.

Andy Goldsworthy

Using nature as his canvas, the artist creates works of transcendent beauty / **BY ARTHUR LUBOW**

On a typical autumn day, Andy Goldsworthy can be found in the woods near his home in Penpont, Scotland, maybe cloaking a fallen tree branch with a tapestry of yellow and brown elm leaves, or, in a rainstorm, lying on a rock until the dry outline of his body materializes as a pale shadow on the moist surface. Come winter, he might be soldering icicles into glittering loops or star bursts with his bare fingers. Because he works outdoors with natural materials, Goldsworthy is sometimes portrayed as a modern Druid; really, he is much closer to a latter-day Impressionist. Like those 19th-century painters, he is obsessed with the way sunlight falls and flickers, especially on stone, water and leaves. Monet—whose painting of a sunrise gave the Impressionist movement its name—used oil paint to reveal light's transformative power in his series of canvases of haystacks, the Rouen Cathedral and the Houses of Parliament. Goldsworthy is equally transfixed with the magical effect of natural light. Only he has discovered another, more elemental way to explore it.

As a fine arts student at Preston Polytechnic in northern England, Goldsworthy, now 49, disliked working indoors. He found escape nearby at Morecambe Bay, where he began constructing temporary structures that the incoming tide would collapse. Before long, he realized that his artistic interests were tied more closely to his youthful agricultural labors in Yorkshire than to life classes and studio work. The balanced boulders, snow arches and leaf-rimmed holes that he crafted were his versions of the plein-air sketches of landscape artists. Instead of representing the landscape, however, he was drawing on the landscape itself.

> "I think the very best works are the ones that could only have been made in one place at that moment and could never be repeated." –ANDY GOLDSWORTHY, SMITHSONIAN, FEBRUARY 1997

Throughout the 20th century, artists struggled with the dilemma of Modernism: how to convey an experience of the real world while acknowledging the immediate physical reality of the materials—the two-dimensional canvas, the viscous paint—being used in the representation. Goldsworthy has cut his way clear. By using the landscape as his material, he can illustrate aspects of the natural world—its color, mutability, energy—without resorting to mimicry. Although he usually works in rural settings, his definition of the natural world is expansive. "Nature for me isn't the bit that stops in the national parks," he says. "It's in a city, in a gallery, in a building. It's everywhere we are."

Goldsworthy's principal artistic debt is to "Land Art," an American movement of the 1960s that took Pollock's and de Kooning's macho Abstract Expressionism out of the studio to create giant earthworks such as Robert Smithson's *Spiral Jetty* in the Great Salt Lake of Utah or Michael Heizer's *Double Negative* in Nevada. Unlike Smithson and Heizer, however, Goldsworthy specializes in the ephemeral. A seven-foot-long ribbon of red poppy petals that he stuck together with saliva lasted just long enough to be photographed before the wind carried it off. His leaves molder, his ice arabesques melt. One work in which he took special joy, a sort of bird's nest of sticks, was intended to evoke a tidal whirlpool; when the actual tide carried it into the water, its creator marveled as it gyrated toward destruction. The moment was captured in *Rivers and Tides*, a documentary film by Thomas Riedelsheimer that portrayed Goldsworthy at work and underscored the centrality of time to his art.

Even those stone stacks and walls that he intends to last for a long time are conceived in a very different spirit from the bulldozing Land Art of the American West. An endearing humility complements his vast ambition. "There are occasions when I have moved boulders, but I'm reluctant to, especially ones that have been rooted in a place for many years," he says, noting that when he must do so, he looks "for ones on the edge of a field that had been pulled out of the ground by farming. The struggle of agriculture, of getting nourishment from the earth, becomes part of the story of the boulder and of my work."

The modesty in his method is matched by a realism in his demands. He knows that nothing can or should last forever. Once a piece has been illuminated by the perfect light or been borne away by the serendipitous wave, he gratefully bids it a fond farewell.

ARTHUR LUBOW lives in Manhattan and is a contributing writer to the New York Times Magazine *specializing in cultural subjects.*

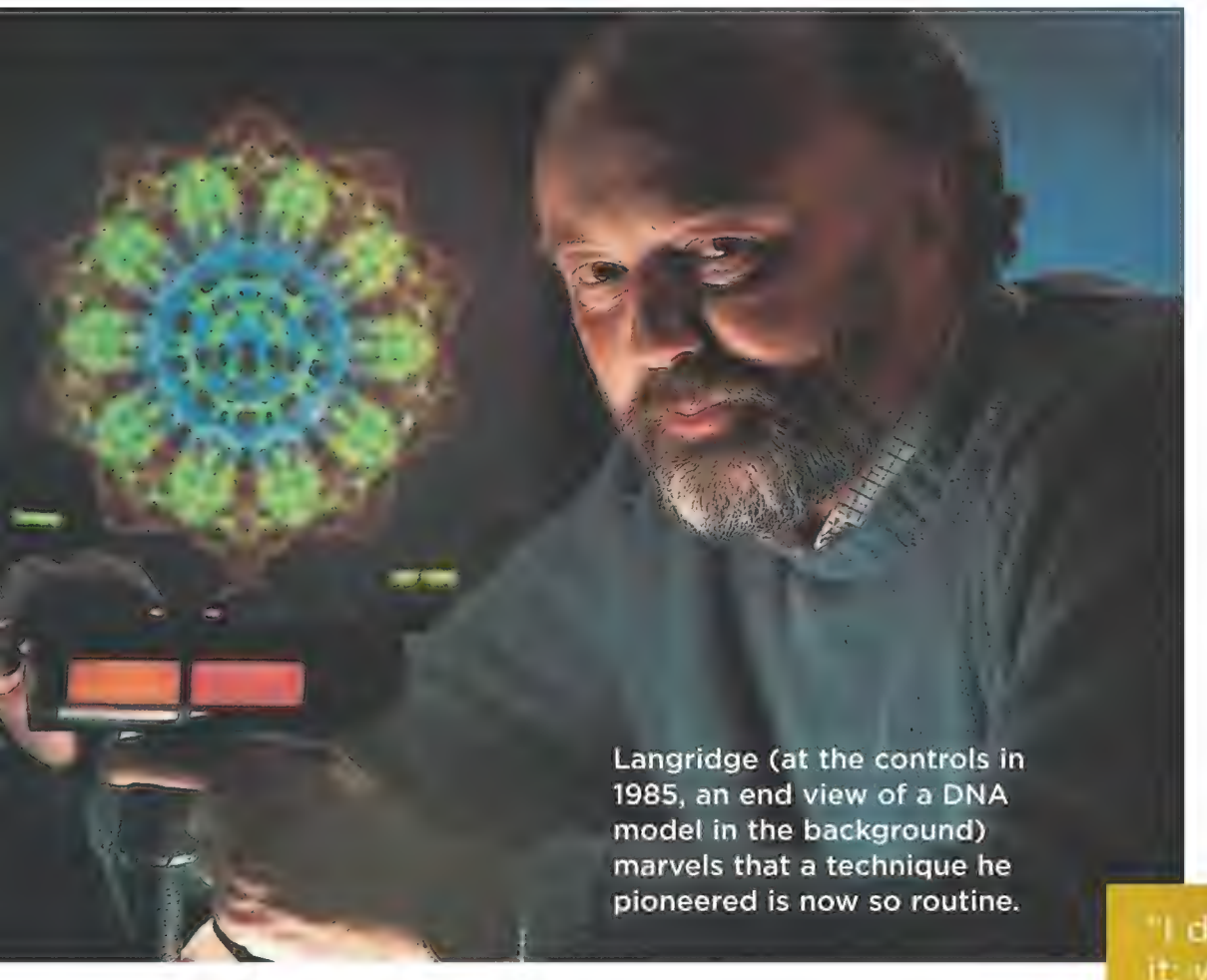
JULIAN CALDER

"I need the resistance of weather, place and material," says Goldsworthy (working on a slate arch in Scaur Glen in Scotland in 1993). "I become somewhat lost faced with the emptiness of a room, a blank sheet of paper or the easy malleability of clay."

Robert Langridge

His quest to peer into the essence of life no longer seems so strange / **BY TERENCE MONMANEY**

LAST TIME WE CHECKED in with Robert Langridge, 20 years ago, he was enjoying a measure of fame for pioneering a way to visualize the invisible—the structure and behavior of key biological molecules, such as DNA. The work dazzled scientists, who for the first time could sit at a computer terminal and manipulate a precise model of a complex molecule, delving into its nooks, twists and strands with the aplomb of a stunt pilot practicing loops in a flight simulator. This was revelatory, because the hormones, enzymes and genetic materials that carry on the work of living cells derive their properties from their structures, and the stick-figure drawings and knobby plastic models that were previously the state of the art take the mind only so far. Langridge's model-making combined scientific data with software painstakingly composed by him and his co-workers, but the colored displays so delighted the eye they were called "painting by numbers."



Langridge (at the controls in 1985, an end view of a DNA model in the background) marvels that a technique he pioneered is now so routine.

Fans of the 1982 movie *Star Trek II* might assume that the swirling DNA model in one segment was, like villain Riccardo Montalban's leonine hairdo, pure Hollywood. In fact, it was the product of the computer graphics laboratory that Langridge opened in 1976 at the University of California at San Francisco. "My colleagues continue to give me a hard time for my 15 seconds of DNA graphics in *Star Trek II*," Langridge says. He's 72 now and lives in Berkeley with his wife of 46 years, Ruth Langridge, who teaches environmental law and policy at the University of California at Santa Cruz and with whom he has three daughters. Bob's career was always about trying to achieve insight into vital phenomena, and in a fashion he's still at it, despite his 11-year retirement. He goes to school. "I took a class on the archaeology of ancient Greece so I could speak with my daughter who's an archaeologist in Greece," he says of his samplings of the Berkeley curriculum.

Langridge, who was born in England, earned his doctorate in 1957 at the University of London under Maurice Wilkins after Wilkins had participated in the discovery of DNA's structure (see page 78). Langridge then plunged into computer modeling at MIT, using IBM machines that filled an entire room, had tiny black-and-white screens, cost $2 million and contained less active memory than last year's Blackberry. "The power you have in your PC today is far beyond what we dreamed of," he says.

To say the least, an awful lot has happened in molecular biology and computers since Langridge's work made a splash. As hoped, computer modeling has generated potential new medications, including one to fight the parasite that causes Chagas' disease, which afflicts some 16 million people in tropical countries. And researchers worldwide have downloaded the San Francisco lab's software some 34,000 times, says director Thomas Ferrin; what was once a precious technology available to a mere handful of well-funded visionaries is now a commonplace. It's fitting, given that a playful mind is said to be at the heart of scientific imagination, that the growth of cheap software and hardware to handle complex imagery can be traced to the demand for ever-better video games. "Access to inexpensive interactive molecular visualization, and scientific visualization in general," Ferrin says, "owes its success to our kids. Go figure."

> "I don't know of a quantitative way to say it: what you do with this is gain insight."
> –ROBERT LANGRIDGE, SMITHSONIAN, JULY 1985

TERENCE MONMANEY, the magazine's executive editor, first wrote about Robert Langridge for SMITHSONIAN *two decades ago.*

CHRISTOPHER SPRINGMANN

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What is the most important information I should know about BONIVA?
BONIVA may cause serious problems in the stomach and the esophagus (the tube that connects your mouth and stomach) such as trouble swallowing, heartburn, and ulcers (see **"What are the possible side effects of BONIVA?"**).

You must take BONIVA exactly as prescribed for BONIVA to work for you and to lower the chance of serious side effects (see "How should I take BONIVA?").

What is BONIVA?
BONIVA is a prescription medicine used to treat or prevent osteoporosis in women after menopause (see **"What is osteoporosis?"**).
BONIVA may reverse bone loss by stopping more loss of bone and increasing bone mass in most women who take it, even though they won't be able to see or feel a difference. BONIVA may help lower the chances of breaking bones (fractures).
For BONIVA to treat or prevent osteoporosis, you have to take it as prescribed. BONIVA will not work if you stop taking it.

Who should not take BONIVA?
Do not take BONIVA if you:
- have low blood calcium (hypocalcemia)
- cannot sit or stand up for at least 1 hour (60 minutes)
- have kidneys that work very poorly
- are allergic to ibandronate sodium or any of the other ingredients of BONIVA (see the end of this page for a list of all the ingredients in BONIVA)

Tell your health care provider before using BONIVA:
- if you are pregnant or planning to become pregnant. It is not known if BONIVA can harm your unborn baby.
- if you are breast-feeding. It is not known if BONIVA passes into your milk and if it can harm your baby.
- have swallowing problems or other problems with your esophagus (the tube that connects your mouth and stomach)
- if you have kidney problems
- **about all the medicines you take** including prescription and non-prescription medicines, vitamins and supplements. Some medicines, especially certain vitamins, supplements, and antacids can stop BONIVA from getting to your bones. This can happen if you take other medicines too close to the time that you take BONIVA (see **"How should I take BONIVA?"**).

How should I take BONIVA?
- Take BONIVA exactly as instructed by your health care provider.
- Take BONIVA first thing in the morning at least 1 hour (60 minutes) before you eat, drink anything other than plain water, or take any other oral medicine.
- Take BONIVA with 6 to 8 ounces (about 1 full cup) of plain water. Do not take it with any other drink besides plain water. Do not take it with other drinks, such as mineral water, sparkling water, coffee, tea, dairy drinks (such as milk), or juice.
- Swallow BONIVA whole. Do not chew or suck the tablet or keep it in your mouth to melt or dissolve.
- After taking BONIVA you must wait at least 1 hour (60 minutes) before:
  - -Lying down. You may sit, stand, or do normal activities like read the newspaper or take a walk.
  - -Eating or drinking anything except for plain water.
  - -Taking other oral medicines including vitamins, calcium, or antacids. Take your vitamins, calcium, and antacids at a different time of the day from the time when you take BONIVA.
- If you take too much BONIVA, drink a full glass of milk and call your local poison control center or emergency room right away. Do not make yourself vomit. Do not lie down.
- Keep taking BONIVA for as long as your health care provider tells you. BONIVA will not work if you stop taking it.
- Your health care provider may tell you to exercise and take calcium and vitamin supplements to help your osteoporosis.
- Your health care provider may do a test to measure the thickness (density) of your bones or do other tests to check your progress.

What is my BONIVA schedule?
Schedule for taking BONIVA 150 mg once monthly:
- Take one BONIVA 150-mg tablet once a month.
- Choose one date of the month (your BONIVA day) that you will remember and that best fits your schedule to take your BONIVA 150-mg tablet.
- Take one BONIVA 150-mg tablet in the morning of your chosen day (see **"How should I take BONIVA?"**).

What to do if I miss a monthly dose:
- If your next scheduled BONIVA day is more than 7 days away, take one BONIVA 150-mg tablet in the morning following the day that you remember (see **"How should I take BONIVA?"**). Then return to taking one BONIVA 150-mg tablet every month in the morning of your chosen day, according to your original schedule.
- **Do not** take two 150-mg tablets within the same week. If your next scheduled BONIVA day is only 1 to 7 days away, **wait** until your next scheduled BONIVA day to take your tablet. Then return to taking one BONIVA 150-mg tablet every month in the morning of your chosen day, according to your original schedule.
- **If you are not sure what to do if you miss a dose, contact your health care provider who will be able to advise you.**

Schedule for taking BONIVA 2.5 mg once daily:
- Take one BONIVA 2.5-mg tablet once a day first thing in the morning at least 1 hour (60 minutes) before you eat, drink anything other than plain water, or take any other oral medicine (see **"How should I take BONIVA?"**).

What to do if I miss a daily dose:
- If you forget to take your BONIVA 2.5-mg tablet in the morning, **do not** take it later in the day. Just return to your normal schedule and take 1 tablet the next morning. **Do not** take two tablets on the same day.
- **If you are not sure what to do if you miss a dose, contact your health care provider who will be able to advise you.**

What should I avoid while taking BONIVA?
- Do not take other medicines, or eat or drink anything but plain water before you take BONIVA and for at least 1 hour (60 minutes) after you take it.
- Do not lie down for at least 1 hour (60 minutes) after you take BONIVA.

What are the possible side effects of BONIVA?
Stop taking BONIVA and call your health care provider right away if you have:
- **pain or trouble with swallowing**
- **chest pain**
- **very bad heartburn or heartburn that does not get better**

BONIVA MAY CAUSE:
- pain or trouble swallowing (dysphagia)
- heartburn (esophagitis)
- ulcers in your stomach or esophagus (the tube that connects your mouth and stomach)

Common side effects with BONIVA are:
- diarrhea
- pain in extremities (arms or legs)
- dyspepsia (upset stomach)

Less common side effects with BONIVA are short-lasting, mild flu-like symptoms (usually improve after the first dose). These are not all the possible side effects of BONIVA. For more information ask your health care provider or pharmacist.

Rarely, patients have reported severe bone, joint, and/or muscle pain starting within one day to several months after beginning to take, by mouth, bisphosphonate drugs to treat osteoporosis (thin bones). This group of drugs includes BONIVA. Most patients experienced relief after stopping the drug. Contact your health care provider if you develop these symptoms after starting BONIVA.

What is osteoporosis?
Osteoporosis is a disease that causes bones to become thinner. Thin bones can break easily. Most people think of their bones as being solid like a rock. Actually, bone is living tissue, just like other parts of the body, such as your heart, brain, or skin. Bone just happens to be a harder type of tissue. Bone is always changing. Your body keeps your bones strong and healthy by replacing old bone with new bone.

Osteoporosis causes the body to remove more bone than it replaces. This means that bones get weaker. Weak bones are more likely to break. Osteoporosis is a bone disease that is quite common in women after menopause. At first, osteoporosis has no symptoms, but people with osteoporosis may develop loss of height and are more likely to break (fracture) their bones, especially the back (spine), wrist, and hip bones.

Osteoporosis can be prevented, and with proper therapy it can be treated.

Who is at risk for osteoporosis?
Talk to your health care provider about your chances for getting osteoporosis.

Many things put people at risk for osteoporosis. The following people have a higher chance of getting osteoporosis:

Women who:
- are going through or who are past menopause ("the change")
- are white (Caucasian) or Oriental (Asian)

People who:
- are thin
- have a family member with osteoporosis
- do not get enough calcium or vitamin D
- do not exercise
- smoke
- drink alcohol often
- take bone thinning medicines (like prednisone) for a long time

General information about BONIVA
Medicines are sometimes prescribed for conditions that are not mentioned in patient information. Do not use BONIVA for a condition for which it was not prescribed. Do not give BONIVA to other people, even if they have the same symptoms you have. It may harm them.

Store BONIVA at 77°F (25°C) or at room temperature between 59°F and 86°F (15°C and 30°C).

Keep BONIVA and all medicines out of the reach of children.

This summarizes the most important information about BONIVA. If you would like more information, talk with your health care provider. You can ask your health care provider or pharmacist for information about BONIVA that is written for health professionals.

For more information about BONIVA, call 1-888-MY-BONIVA or visit www.myboniva.com.

What are the ingredients of BONIVA?
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Daphne Sheldrick

When feelings of kinship transcend the species boundary / **BY DOUGLAS CHADWICK**

MANY OF THE PEOPLE Americans most admire are those who care selflessly for others. We sometimes wonder where their reserves of compassion come from. But truly devoted caregivers have learned a great secret, which is that kindness is replenished by the act of practicing it. Daphne Sheldrick extends her kindness toward the wild animals of Africa, particularly orphans, the most helpless of all.

From 1948, when Kenya's largest national park, Tsavo, was founded, until 1976, the head warden of the main section was David Sheldrick, a former safari guide and the son of a British Army officer. David and Daphne married in 1955, when she was 21. She was soon taking in Tsavo's orphaned and injured animals, from wart hogs to house-cat-size antelopes called dik-diks. In the early 1960s, she devised the first milk formula that kept rhino infants alive. Following years of trial and error, she also perfected a baby formula for elephants, whose capacities for sorrow, joy and tenderness inspired her more with each passing year.

Like human beings, elephants develop under the constant care of their mothers, reach sexual maturity as teenagers and live to be 70 or 80 years old. Females almost never leave their tightly knit matriarchal families. Elephants will physically support a sick or hurt relative trying to walk. If it can't move, they bring it food and water in their trunks. They may linger near a dead body for days and partially bury it. Elephants appear to suffer serious depression after losing companions; some say elephants have even died of grief.

After David Sheldrick died in 1977, Daphne, with other wardens and conservationists, established the David Sheldrick Wildlife Trust, which funds her work. That same year, the Kenyan government granted her permission to build a home within Nairobi National Park. When I met Sheldrick there, in 1989, she was soothing a baby elephant so traumatized after ivory poachers killed its family that it screamed in its sleep, apparently suffering nightmares. Another young elephant had made friends with an orphaned black rhinoceros, one of the last females from the Amboseli National Park population, which had been poached out of existence for its long horns.

Got milk? Sheldrick (in 2001 at her animal orphanage in Kenya) developed a formula for feeding baby elephants.

GERRY ELLIS / GLOBIO / MINDEN PICTURES

Daphne Jenkins grew up on a Kenyan dairy farm. At the age of 3, she was given a young bushbuck to nurture. When it was older and the time came to let it go, she "wept buckets," she told me, but she learned that the truest kindness you can show a wild creature is to help it be free. In her 70s today, she teaches people how to tend to baby elephants and eventually reunite them with wild herds. The trust has also restocked reserves with rhinos, zebras and buffaloes.

> Once under Sheldrick's care Zoe thrived, earning a reputation as a confident, naughty and mischievous youngster.
>
> –SMITHSONIAN, MARCH 1997

Daphne Sheldrick received both an MBE (Member of the British Empire, an honor given by the queen) and an MBS (Moran of the Burning Spear, a Masai warrior title bestowed by Kenya's government). The United Nations Environmental Programme placed her on its Global 500 Roll of Honour. Yet long before the accolades, she was simply a woman who took in wild animals because they needed help. Elephants don't forget. Her face and voice will live in the memory of many a hand-reared orphan for decades as they roam the parklands of East Africa, trumpeting their freedom.

DOUGLAS CHADWICK, a self-described "mush-hearted elephant groupie," authored True Grizz *and* The Fate of the Elephant.

Julie Taymor

Transcending genres, the designer and director creates shamanistic theater / **BY EDWARD ROTHSTEIN**

WATCH THE OPENING of Disney's Broadway musical *The Lion King*, and you feel something like a sense of the ecstatic—the ecstatic not just as a state of pleasure or excitement, but the ecstatic in its old, almost archaic sense of being lifted out of one's familiar state. The animals of Africa come parading down the aisles as if they too had undergone such a transformation, their skin and feathers turned into poles and fabric, their bodies turned into hybrid surfaces mixing the flesh of the puppeteers and the mechanisms of puppets. They are grand and finely wrought, as miraculous as their live counterparts, leaping and loping onto the stage as if celebrating themselves and their maker.

Such is the thrill of Julie Taymor's theater magic, though the ecstasy is not always so sunny and the transformations are not usually so celebratory. In her stagings, her puppetry and her writing, the ecstasies more often descend into darkness: the human is turned into animal, playfulness is turned into violence; a boy becomes a jaguar and devours his taunters; a mother becomes a killer and spurs her sons to revenge. It is no accident that Taymor is the chosen director for a forthcoming Broadway production of *Spider-Man*—another tale of troubled transformation in which human and animal intertwine.

Taymor, who won two Tony Awards for the direction and costume design of *The Lion King*, who won a MacArthur "genius" award in 1991, who directed Anthony Hopkins in the film *Titus* and Salma Hayek in *Frida* and who is the director of last year's acclaimed production of Mozart's *The Magic Flute* at the Metropolitan Opera in New York, is really a shaman of sorts. She has the ability to move between worlds, pass across borders, descend into darkness and reemerge with promises of transformation. Her major tools are puppet and mask, which in their expressive detail are objects that seem in the midst of transformation themselves—ecstatic objects, half-human, half-thing; half-alive, half-dead. She was drawn to their powers even as a child. And when Taymor was 16, she finished her Newton, Massachusetts, high school a semester early and studied in Paris at L'École de Mime Jacques LeCoq, where she worked with masks, learning, she told SMITHSONIAN in 1993, "how to transform myself into a nonhuman object" as well as "how to infuse an inanimate object with character."

Using these otherworldly talismans, she has steadfastly attempted to cross boundaries, not only between the human and nonhuman or between life and death—the shaman's traditional realms—but between theatrical genres: Western staging and Indonesian drama, folk tale and high art, realism and fantasy. In the 1970s Taymor spent

"I like the perspective [that being an outsider] gives me. I'm able to be immersed and distanced at the same time."
—JULIE TAYMOR, SMITHSONIAN, FEBRUARY 1993

Taymor (on the *Lion King* set in 1998) is working on a new opera, *Grendel*, retelling the *Beowulf* saga from the monster's point of view.

ANNIE LEIBOVITZ / CONTACT PRESS IMAGES

EDWARD ROTHSTEIN, who writes on history and culture, is critic-at-large for the New York Times.

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four years in Indonesia, ran her own theater troupe and toured with a theater piece called *Tirai*, meaning "curtain." Only, in this case, the curtain is torn: it is about a tragic failure to negotiate transitions between Indonesian culture and the West. A young man, trying to straddle the divide, ends up lost, at home in neither.

But if transitional challenges were unreconcilable to some, Taymor managed to pass back and forth with great care, eventually returning to the United States and working first as a stage designer, then as a creator and director. She staged a series of theater pieces that crossed ethnic and historical boundaries. One was about the Jewish celebration of Passover (*The Haggadah*). Another was about an American Indian seer (*Black Elk Lives*). Her first triumph came in 1988 with *Juan Darién: A Carnival Mass*, which she wrote with her musical collaborator and longtime companion, the composer Elliot Goldenthal. It was a tale, told with puppets and masked characters, of a jaguar who is turned into a boy. Like *Tirai*, it is ultimately a tale of a failure, in which its characters are unable to negotiate the boundaries between the human and animal worlds.

But Taymor's reputation was made by her ability to explore both. By staging dramas about opposing worlds or tragic failures to manage them, Taymor ended up becoming the shaman who could manage both. At their best, Taymor's works allow opposing worlds to interact. In the 1992 film version of her staging of Igor Stravinsky's *Oedipus Rex*, for example, there are two Oedipuses, one singing words adapted from Sophocles, the other, a Butoh dancer, mimicking the doomed king, enacting his history in formalized gesture. One is the man, the other, apparently, a kind of puppet, though by the end, both are enmeshed, for Oedipus too, we see, is a puppet, his destiny manipulated by the Fates.

Taymor is not, of course, always successful. There are times when she veers too far in one direction or another and something seems missing. When the film *Frida*, based on a biography of the Mexican painter Frida Kahlo, is merely telling its tale, it becomes an overly conventional homage; only when it turns as surreal, mercurial and conflicted as the images painted by its subject does it come fully alive.

Now Taymor and Goldenthal are working on an ambitious opera, *Grendel*, to première in Los Angeles next May. It will retell the *Beowulf* saga from the monster's point of view, and again promises to explore the boundaries between human and beast. If it succeeds, it will take its place in Taymor's attempt to create a form of shamanistic theater. This may also be what has lured her to the film she is now making (for release late next year) using Beatles songs to chronicle the 1960s—an era with its own theatrical reverberations of disillusion and ecstatic transformation. In Taymor's universe, drama becomes ritual. Its aim becomes ecstasy in that ancient, liberatory sense. And if risks undertaken by its characters often end in failure, the hope is that similar risks, undertaken by creator and audience, may end in triumph.

Wendell Berry

A Kentucky poet draws inspiration from the land that sustains him / **BY PAUL TRACHTMAN**

WENDELL BERRY, FARMER AND POET, has lived in sight of the Kentucky River for 40 years, in a landscape where generations of his family have farmed since the early 1800s. The river is probably the only mainstream close to his heart. As a farmer, he has shunned the use of tractors and plowed his land with a team of horses. As a poet, he has stood apart from the categories and controversies of the literary world, writing in language neither modern nor postmodern, making poems that have the straightforward elegance of the Amish furniture in his farmhouse. And in recent decades, he has produced a body of political thought, in a series of essays and speeches, that is so Jeffersonian it seems almost un-American in today's world.

Berry argues that small farms and farm communities are as vital to our liberties now as they were in Jefferson's day. The agribusiness corporations and developers that have all but replaced them, he warns, are eroding our freedom along with our soil. In a recent essay, "Compromise, Hell!" he writes: "We are destroying our country—I mean our country itself, our land. . . . Most of us are still too sane to piss in our own cistern, but we allow others to do so and we reward them for it. We reward them so well, in fact, that those who piss in our cistern are wealthier than the rest of us."

At 71, Berry and his wife, Tanya, live on their 125-acre farm, producing almost all the food they eat: table vegetables from the garden, meat from their flock of sheep. They sell some sheep and take firewood from the woodland, and their livestock graze on green pastures. During Berry's years as a writer—he has produced some 40 volumes of poetry, fiction and essays—and a teacher in the English department at the University of Kentucky, the couple has practiced and achieved the respectable degree of self-sufficiency that Berry preaches. They have improved the land, raised a family and seen both of their children take up farming nearby. Their son, Den, and his wife, Billie, raise cattle, corn and hay on a farm five miles away; Den makes furniture to augment the family income. Their daughter, Mary, and her husband, Chuck Smith, ten miles away, have

PAUL TRACHTMAN is a writer, painter and printmaker. He works out of his studio on a farm in New Mexico.

preserved an old farm by turning it into the Smith-Berry winery, while also raising cattle and crops.

Twenty-five years ago, Berry wrote in SMITHSONIAN about the hard work of reclaiming land that had been neglected and abused, of learning how to properly cultivate and care for it. When I visited the farm recently, he was pleased to show me how the land has responded. "Tanya and I just got back from a sheep sale," he remarked, "and I drove up the creek and thought, this is so beautiful, completely beautiful. You don't know how beautiful it is unless you see it every day. You may forget about it in the frustrations and heartbreak of farming and your life, but then it'll come to you again, you'll see it again."

Berry has criticized the environmental movement for separating wilderness from farmland in its conservation campaigns. Showing me around the place, he said, "This is the front line of the conservation struggle too. I don't think people realize how much work, actual physical work, would be involved in restoring this country to some kind of health. My experience over the last 25 years has been that not many people speak, or can think, from the point of view of the land. As soon as the conversation shifts from issues actually affecting the land, to 'the environment,' then you're done for. People think of it as something different from themselves, and of course it isn't."

No less critical of the agricultural establishment, Berry gained considerable public attention 30 years ago with his book *The Unsettling of America*, a manifesto against the government's advice to farmers: get big or get out. "I suppose the main misfortune in my life," he says, "is that the public situations I've tried to address haven't changed very much. I thought that book was a way of taking part in a public conversation, and the public conversation hasn't happened—not, for sure, in the capitols or in the mainstream media."

Berry has been joined by a growing community of allies, however, in pressing Jefferson's claim that "The small landholders are the most precious part of a state." And the public, for its part, has been showing an increased interest in farmers' markets, locally grown organic produce, and consumer co-ops that offer healthier foods—all signs that small farms, after decades of decline, could someday make a comeback. The greatest obstacle, Berry worries, is a lack of people to work the land. "How are you going to get these people?" he wonders. "And how are you going to keep them at it once you've got them, past the inevitable disillusionment and the weariness in the hot sun?" When I remind him of an old popular song about farm boys returning from World War I—"How're you gonna keep 'em down on the farm, after they've seen Paree?"—he responds: "How are you going to shut up that voice that's now in every American mind, 'I'm too good for this kind of work'? That is the most insidious voice of all."

Berry (in 2003) has worked his pastures for 40 years: "I realize how fortunate I've been to live where my imagination took root."

GUY MENDES

As a young man, Berry thought he would have to leave his native place and way of life. "In high school my teachers were telling me, you can't amount to anything and stay where you're from. So when I left here I assumed I would be an academic wanderer perhaps, that I'd be going with my 'talent' from one university to another, so I could amount to something. When I decided to come back here, a lot of people I respected thought I was deliberately achieving my ruin." Now his life, and his poetry, belong to the place he came back to. "I realize every day how extremely fortunate I've been as a writer to live where my imagination took root," he says. In his poetry he often gives thanks for his surroundings. He seeks to write, he says in a recent poem, in "a tongue set free from fashionable lies."

"And then I became a farmer almost unintentionally and by a kind of necessity."
—WENDELL BERRY, SMITHSONIAN, AUGUST 1980

I ask if he sometimes feels like an Old Testament prophet, a voice in the wilderness. He can't afford such thoughts, he says. He is determined to have hope. "Part of the reason for writing all these essays is my struggle never to quit, to never utter those awful words 'it's inevitable.'" His writing has sometimes been called radical, but he thinks of himself as a conservative, conserving what is most human in our landscape and ourselves. "You know," he says, laughing, "if you subtracted the Gospels and the Constitution and the Declaration of Independence from my work, there wouldn't be very much left."

Edward O. Wilson

Vindicated for his controversial sociobiology? Yes. Satisfied? Not yet / **BY ROBERT WRIGHT**

THREE DECADES AGO, Edward O. Wilson underwent a bittersweet transformation: from accomplished-but-not-famous Harvard biologist to famous-but-vilified prophet. The man who had spent much of his career holed up in an office writing monographs and got his thrills by tramping through jungles in search of ants became a painfully public figure. As he walked across campus, he heard bullhorn-amplified calls for his dismissal. Protesters handed out leaflets at his lectures. He even got a bucket of water dumped on his head at a meeting of the American Association for the Advancement of Science.

The cause of it all was the 1975 publication of his *Sociobiology: The New Synthesis*. This weighty (5.5 pounds) tome proclaimed that recent extensions of Darwinian theory would bring a revolution in our understanding of the behavior of animals, notably including people; if we wanted to grasp the human predicament and unravel the emotions that push and pull us through life, we had to think about human genes and the process that assembled them, natural selection.

With the project to sequence the human genome essentially completed and newspapers awash in stories about genetics, it may seem hard to believe that juxtaposing "genes" and "human behavior" once aroused grave suspicions. Many incoming Harvard undergraduates have "never even heard there was a controversy," Wilson told me the other day. But in the 1970s, psychology departments were still under the sway of B. F. Skinner's behaviorism—the idea that people are almost infinitely malleable and that characteristics such as jealousy and status-seeking could be eliminated through enlightened child rearing. And political activists on the left were mindful of the unsavory characters who had emphasized biological heredity in the not-too-distant past, from American eugenicists to Adolf Hitler. Thus was Wilson linked to racism and Nazism, notwithstanding the absence of any corroborating evidence.

> "To deny that genes have an important role in human as well as in animal behavior is simply to turn one's back on the copious evidence to the contrary." –EDWARD O. WILSON, SMITHSONIAN, SEPTEMBER 1980

Vindication often comes posthumously in the world of ideas, but Wilson has lived to see his. Theories he hailed as cornerstones of sociobiology—Robert Trivers' "reciprocal altruism" and "parental investment," and William D. Hamilton's "kin selection"—have become powerful tools in the thriving young field of evolutionary psychology, the attempt to explain human emotions and thought patterns as genetically inherited adaptations. And for the record: Wilson's promised revolution in the study of nonhuman animals—a subject that consumed most of *Sociobiology*'s 697 pages and roughly none of the publicity—is proceeding apace.

So Wilson could be excused if, at age 76, he declared victory and settled into self-satisfied retirement. But he isn't the retiring kind. (His wife, Irene Wilson, has long been tolerant of his no-vacations policy, which is one reason that his 1971 classic, *The Insect Societies,* is dedicated to "Irene, who understands.") Besides, no sooner had Wilson's left-wing antagonists faded than trouble appeared on the opposite horizon. He says that the religious right's increasingly vocal opposition to Darwinian theory is rooted largely in a "dislike of human sociobiology," especially the idea that human values flow from biology rather than from a nonphysical soul.

He doesn't expect a rapprochement between the two worldviews. When it comes to the "meaning of humanity, the meaning of life, which is what the cultural war is all about," says Wilson, "we do differ drastically, and I think insolubly." But that hasn't stopped him from writing about an alliance between science and religion, to be published next year and tentatively titled *The Creation*. The alliance is political. He's "calling on the religious community," he says, "to join the scientists and environmentalists to save the creation—the world's biodiversity."

The greater acceptance of Wilson's ideas has not buffered him from criticism. Indeed, challenges now come from some allies in the early struggle, some of whom insist that Wilson's role in "the sociobiology revolution" has been oversold. Not one of the key theories was his, they say. Wilson's defenders emphasize the importance of his intellectual syn-

ROBERT WRIGHT, a senior fellow at the New America Foundation, is the author of Nonzero: The Logic of Human Destiny.

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With an eye for the hot topic, Wilson (in 2004) calls for science and religion to join forces to save biodiversity.

thesis—of *Sociobiology*'s vast web of data and analysis, encompassing species from bacteria to humans.

In a sense, the question isn't whether Wilson's legacy will be robust, but whether it will be cast more in scientific or literary terms. He has written several bestsellers and landed two Pulitzer Prizes (in 1978 for *On Human Nature* and in 1990 for a coauthored book, *The Ants*). And not even his detractors deny his gift for prose that is alternately sweet and pungent, and often brilliantly provocative. "Men would rather believe than know," he wrote in *Sociobiology.*

But Wilson's sharp pen isn't the only reason the last of those books made him so renowned. There's another virtue he has in rare quantity. His 1998 book, *Consilience*, about the convergence of diverse scientific fields into a unified explanatory framework, was a blast of Enlightenment-era optimism about the scientific project. Someday, Wilson believes, the cause-and-effect principles of psychology will rest solidly and specifically on those of biology, which will rest with equal security on principles of biochemistry and molecular biology, and so on down the line to particle physics. ("Consilience," with its air of interdisciplinary harmony, sounds much nicer than its rough synonym, "reductionism"—another tribute to Wilson's rhetorical prowess.)

This optimism—or even "faith," as Wilson has unabashedly described his conviction about the unity of knowledge—is what propelled him on the epic exercise that produced *Sociobiology*. In three years, even while teaching, he wrote half a million words—about four normal-sized books. As a result, Wilson was the one who got to trumpet the coming revolution. His book came out a year before Richard Dawkins' *The Selfish Gene*, which made much the same argument.

Wilson's fervent faith in scientific progress proved more than a motivator; it proved right. Witness advances in fields from neuroscience to genomics to pharmacology—and their increasing interconnection. So even if posterity forgot about Wilson's many contributions to the study of insects and other nonhuman animals, it would have to concede that he is more than a popularizer. He is a visionary, and a visionary whose track record is looking pretty good.

Wilson is a lapsed Southern Baptist—Christianity yielded to Darwinism during his undergraduate years—but in the end his salvation has nonetheless come through faith. And, of course, through works.

Wilson (in a Massachusetts forest in 2002) still fervently studies ants.

John Dobson

Come one, come all. Share the sky with the father of sidewalk astronomy / **BY DON MOSER**

AN ELDERLY MAN with a white ponytail lies in wait on a city sidewalk with a small solar telescope specially designed so that a person can view sunspots without damaging the eye. As a group of tourists approaches, he begins to twirl a lariat and jump nimbly in and out of the spinning loop. "Come, come see the sun," he cries to the startled tourists. And they do come, of course, because they have been ensnared by John Dobson.

John Dobson, the father of sidewalk astronomy, the designer of a portable mount that supports his large, inexpensive telescopes, and, perhaps, astronomy's greatest cheerleader, brought the farthest stars to the man on the street. He has just celebrated his 90th birthday, and the years have not slowed him down. Barry Peckham, vice president of the Hawaiian Astronomical Society, says, "He has two states of being: one is sleeping and one is talking." For nearly four decades he has gypsied around the world, corralling unsuspecting citizens and tourists, and with his kinetic energy and his instinct for the homely analogy ("If the sun were the size of a basketball, Jupiter would be the size of a grape, and the Earth would be the size of a very small grape seed"), making them look at things they never knew were there.

> "As a monk, I was interested to understand this whole Universe."
>
> –JOHN DOBSON, SMITHSONIAN, APRIL 1989

The night is full of wondrous things—giant galaxies that look like pinwheels, clusters where stars swarm like bees, gauzy nebulae adrift in the Milky Way—but most of these lie beyond the capacity of the human eye. A large telescope—the larger the better to gather light—makes these objects visible. Says legendary comet-hunter David Levy, borrowing a thought from Bob Summerfield, co-director of Astronomy To Go, a traveling star lab: "Newton made telescopes for astronomers to observe the universe; John Dobson makes telescopes for the rest of us."

Nearly a million people have looked through Dobson's telescopes, which he constructs from castoff pieces of plywood and scraps of two-by-fours, cardboard cen-

DON MOSER, former editor of SMITHSONIAN, *is an amateur astronomer with a six-inch telescope on a Dobsonian mount.*

MATTHEW CAVANAUGH / AP PHOTO

Dobson (in 1988) says that if he doesn't set up a telescope each evening for the public, "when I go to bed, I don't feel very useful."

ROGER RESSMEYER / CORBIS

ters of hose reels, chunks of cereal boxes and portholes from old ships. He puts his scopes on portable mounts that swivel sideways and up and down. "The Dobsonian Revolution was with just letting people look through the big telescopes, which was an extraordinary thing to do," says Levy. "I think every advanced amateur astronomer in the world has at least one Dobson telescope."

Today Dobson's influence reaches far from his small apartment in San Francisco. For transportation costs, room and board and a small honorarium, he still gives lectures and teaches telescope-making at star parties, at colleges and museums, and to amateur astronomy clubs. "They fly me all over the place," he says, to such far-flung destinations as Chile, Italy, New Zealand, India and Russia. In 2006, he will travel for ten months to China and Siberia, among other places. Though Dobson seems oblivious to the impact he makes on others, he is a cult figure to thousands of amateur astronomers who have read about him in books and articles. When he shows up at a local astronomy club, "It's like traveling with a movie star," says Donna L. Smith, his personal assistant. "He did more to inspire them than he can imagine." And a movie star he is. Jeffrey Fox Jacobs' documentary, *A Sidewalk Astronomer*, about Dobson, premièred this year and is available on DVD and videocassette (from telescopepictures.com).

"They would have burned me at the stake," says Dobson (in San Francisco with sidewalk astronomers in 1989).

ROGER RESSMEYER / CORBIS

Born in China, grandson of the founder of Peking University and son of a zoology teacher there, Dobson enrolled at the University of California at Berkeley in 1943 to become a chemist (a profession he later practiced for a while). Then, in 1944, Eastern religion lured him to a San Francisco monastery of the Vedanta Society of Northern California. As a monk, he began building telescopes surreptitiously, using found materials. But as he moved on to larger telescopes, perfecting the simple and inexpensive design that would later bring him fame but not fortune, he decided he had to share his experience.

He spent so much time outside the monastery teaching telescope-making and showing neighbors the stars that he was finally asked to leave the religious order. And so in 1967 Dobson found himself a penniless ex-monk, sleeping on a rug in a friend's house in San Francisco. But he continued to scrounge materials to build telescopes, and the next year with other enthusiasts he organized the San Francisco Sidewalk Astronomers, who began setting up telescopes in the middle of the city and attracting lines of people around the block. Dobson and his crew later loaded an old school bus with big telescopes and toured the national parks, deploying Long Eye, Little One, Psychedelic Zebra and the 24-inch behemoth, Delphinium. A park ranger once questioned the appropriateness of the telescopes, saying, "The sky is not a part of the park," to which Dobson replied, "No, but the park is part of the sky."

Dobson's invention is not so much a type of telescope as a system of making and mounting one. (Basically, he uses the same type of reflecting telescope devised by Sir Isaac Newton in 1668.) But Dobson's mirrors are thin, light and cheap, and made from the bottoms of glass gallon jugs instead of optical glass. He created a mount that made weights unnecessary. Where an eight-inch amateur telescope with accessory widgets can cost $2,400, a basic eight-inch telescope can be made at home for $200.

His telescopes have been replicated thousands of times, not only by amateur builders but by commercial manufacturers who advertise them as "Dobsonians." Dobson himself earns no royalties. What matters to him is getting big telescopes out there. He explains: "It was high time for somebody to show the amateurs that they could make bigger telescopes" than the little tiny ones they had been running.

Notes San Francisco sidewalk astronomer Kenneth Frank, "He makes you look at things in almost a childlike light." Dobson thinks of it in another way: "Most of the things I say are within everybody's grasp, but then I try to lead them out for a reach."

Leading people out for a reach is what bothers some astronomers. His attempted reconciliation of a religious view with a scientific one has made for critics. "It's not that he thinks outside the box," reflects filmmaker Jacobs. "He doesn't even *see* the box." Or, for that matter, believe in the Big Bang. "First of all, they have it coming out of nothing and that's impossible," he says. "And then they have it coming out of a black hole and that's just as impossible." Dobson believes in something bigger than the bang. "He thinks he's got the secret to the universe," complains one astronomer. Chortles Dobson, "Hundreds of years ago they would have already burned me at the stake."

Immolation aside, Dobson has left an enduring astronomical legacy. He is fond of quoting the New Zealand astronomer Graham Loftus: "What we need is a big telescope in every village and hamlet, and some bloke there with that fire in his eye who can show something of the glory the world sails in." He could, of course, have been talking about his friend John Dobson.

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Mark Lehner

He took the blue-collar approach to the great monuments of Egypt / **BY ALEXANDER STILLE**

MARK LEHNER has probably done more than anybody to advance our understanding of the ordinary Egyptians who built the Great Pyramids and the Sphinx at Giza. That he has never been a conventional Egyptologist may be the reason why.

When I caught up with him recently, he was moving out of his office at Harvard's Semitic Museum and into rented offices near the Massachusetts Turnpike. "No one gives up an office in a university," he said as he hauled his own photocopier into his new digs. Ten years ago, he gave up a tenure-track position at the University of Chicago to excavate at Giza, near Cairo, with private funds. "People thought I was crazy to leave Chicago," says Lehner, 55. But he wanted to work at the dig full time, not just between semesters. When Harvard offered him space at its museum with no teaching responsibilities, he gratefully accepted. Now his project has outgrown even Harvard's largesse, requiring new quarters. "If our funding dries up and we run out of money, we can always sublet them," he says.

Lehner was first drawn to Giza some 30 years ago as an acolyte of Edgar Cayce, the leader of a proto-New Age cult that believes Egypt's ancient monuments were built by the people of Atlantis, the mythical island that supposedly slipped beneath the sea. Lehner hoped to find the Great Hall of Records that Cayce insisted the Atlanteans had buried near Giza's Sphinx. But the longer Lehner stayed, the more he realized that ancient Egyptians, not Atlanteans, had lived there. And while he never abandoned a sense of being on a quest—of searching for larger meanings—he shifted his focus to one of the most astonishing developments in human history: the creation of centralized states in the third millennium B.C., of which the pyramids and the Sphinx are the most dramatic manifestation.

> Lehner's heart lies . . . [with] "all those thousands who aren't mentioned in the hieroglyphs."
>
> —SMITHSONIAN, APRIL 1986

In 1986, after 13 years in Egypt, Lehner returned to the United States to get a PhD in Egyptology at Yale. But he came back to Giza during breaks in his academic schedule to work with the Egyptian archaeologist Zahi Hawass on a

"The whole site shouts 'control,'" says Lehner (at Giza in 2001). "It's like the state left its huge footprint there and then walked off."

ALEXANDER STILLE, author of The Future of the Past, *teaches at the Graduate School of Journalism at Columbia University.*

documentary film (narrated by the actor Omar Sharif) about the Giza plateau. Although Lehner calls it a "schlockumentary," the film helped attract private funding to join Hawass in a shared dream: a full stratigraphic dig for the lost city of the pyramid makers.

After completing his PhD in 1990, Lehner shuttled between teaching responsibilities at the University of Chicago's Oriental Institute and the Giza dig. And in 1991, he found the remains of two ancient bakeries—the oldest intact bakeries in Egypt at that time. The bakeries, Lehner says, "turned out to be the tail of a huge archaeological beast," and they opened a window onto the daily lives of the people who built the pyramids. When his not-for-profit research institute got to the point where it could support him and one other employee in 1995, Lehner gave up teaching and dedicated himself wholly to the dig. Since 1989, it has grown from about a dozen people to some 175 and has mapped about 17 acres of the ancient city, the largest exposure of settlement from the third millennium B.C. in Egypt.

One idea the probe has helped to debunk is that the pyramids were built by "an army of slaves." (The Greek historian Herodotus, writing centuries after the fact, refers obliquely to some 100,000 slaves.) The people who built the pyramids were more likely a few thousand highly skilled and well-compensated full-time craftsmen and a cast of manual laborers. And all of them were well-fed.

"People were eating lots of meat," Lehner says. "Our faunal specialist has estimated that there were enough cattle, goat and sheep to feed 6,000 to 7,000 people if they ate meat every day." It is more likely that then, as now, Egyptians tended to eat meat on special occasions, so the population may have been larger.

The workers appear to have been organized in teams of about 40, each living in one of a series of long gallery-like barracks. Each may have had, like the one completely excavated example, its own bakery and dining area and porches with rows of sleeping platforms. "The whole site shouts 'control,'" Lehner says.

He and others see the construction of the pyramids as a crucial step in state-building—the vastness of the project required creating a national system of administration. "I think of the site as something like a gigantic computer circuit," Lehner says, reflecting the organization and structure of the early Egyptian state. "It's like the state left its huge footprint there and then walked off."

This ancient city, he notes, was probably inhabited for only a few generations—perhaps just long enough for the pyramids to be completed. But Lehner himself has no intention of moving on. There are, he estimates, another seven or more acres to excavate, and there are signs that beneath his current excavation lies an even earlier layer. "We think it might be [from the time of] Khufu," he said—the Pharaoh who began it all with the building of the Great Pyramid some 2,600 years before Christ.

Sally Ride

A generation later, the first female astronaut is still on a mission / **BY K.C. COLE**

SALLY RIDE, the nation's first woman astronaut, no longer flies for NASA, but she has embarked on a mission into territory that is just as mysterious and controversial, and is much closer to home: making sure that girls get to share in the adventure that is science.

This is not an easy task in an age when the president of Harvard, no less, hypothesizes that girls can't cut it in science because they lack the inherent ability. In truth, though, Dr. Ride, who earned her doctorate in physics, thinks that Dr. Lawrence Summers' January 2005 statement inadvertently helped more than harmed her cause. "He probably couldn't have planned it better," she said at her headquarters in San Diego, smiling with obvious satisfaction. "He really touched a nerve."

Summers' suggestion implied a troubling blindness. After all, many of the country's top mathematicians, engineers, astronomers and physicists are women—which is quite an achievement considering that until the latter part of the past century, many women were barred from earning advanced degrees in such fields. It's even more of an achievement given that girls who burn to explore still face speed bumps and stop signs all along the road—from grade school to academia.

Ride sees it all the time. When she talks to groups of elementary school students, as many girls as boys say they want to be astronauts. When she speaks to college physics classes, the girls have gone. "What happened to those fourth-grade girls?" she asks.

She gets the answers when she talks with women who wanted to be astronomers or archaeologists, but were told that they were dumb in math—in the third grade! Or were excluded from the engineering club in high school. Years later, when these women find out they'd missed their chance to take part in the quest to understand their universe, it really hits home. "Here's the president of Harvard who simply doesn't understand the impact [that attitude] has had on my life!" Ride says. "It's personal. That's why he got such an outpouring."

Even today, Ride says, "you see all these boys who get C's in math and say, 'I'm going to be an engineer!' And all

K.C. COLE is the author of The Universe and the Teacup*; she is writing a book about the physicist Frank Oppenheimer.*

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Twenty years after the Soviet Union sent a woman into space, Sally Ride (in 1983 aboard the *Challenger*) blasted off.

Ride agreed that she sometimes got in a light plane and just goofed off for the fun of it.

–SMITHSONIAN, SEPTEMBER [illegible]

these girls who get A's in math and say, 'I'm not good enough.'"

Exploring the mysteries of our ever-fantastical universe—whether it's at the level of a cell, a molecule, or the whole amazing shebang—is not simply a sideline or vocation; it's at the soul of human experience. "It's what people do!" Ride says; she considers exploring as central to life as breathing. And so she's spent the past five years creating the Sally Ride Science Club, science festivals, summer camps, newsletters, career guides, Web site and books—all under the umbrella of her company, Sally Ride Science. She doesn't even mind being a "brand"—which is curious when you consider that even after she blasted through NASA's glass ceiling with a 1983 flight on the *Challenger*, she didn't let anyone write an authorized biography because she didn't feel she'd done enough. Celebrating her credentials "has a different feel to it when it has a purpose beyond making yourself famous."

That purpose is to smooth the bumps, especially for the middle school girls who seem to be the most vulnerable. Her message is as deceptively simple as it is true: hey girls, it's your universe too. Science isn't a guy thing. Not only can you be a girl, you can be a mom, wear makeup, dance the samba, serial shop, and still be a scientist.

"It's amazing that people can make a career out of asking questions," she says. "Everyone wants to be part of the quest for understanding."

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Gordon Parks

Each day is still too short in the wide-ranging life of the master multitasker / **BY ROY ROWAN**

AT AN AGE when most men are resting on their laurels, if not simply resting, Gordon Parks has just written yet another memoir (*A Hungry Heart*) and another illustrated book of poetry (*Eyes With Winged Thoughts*), both scheduled for publication by Simon & Schuster this month, in time for his 93rd birthday, November 30. He is also composing a sonata for the celebrated cellist Yo-Yo Ma, cooking for friends and presiding over a widely scattered family of three children, five grandchildren and five great-grandchildren who all call him Pepe.

Recently, I watched this friend of some 50 years pad restlessly around his bachelor's apartment overlooking Manhattan's East River in his workaday outfit: a navy sweater with a New York City detective's badge embroidered in gold over his heart, baggy pants and sneakers. A baseball cap turned backwards covered the mop of swept-back white hair inherited from his father's part-Cherokee ancestors.

"Haven't you achieved enough for one lifetime?" I asked.

"No," he answered, puffing slowly on an ever-present pipe protruding from under his bushy white mustache and in a voice so soft it barely registered on my tape recorder. "If I stop creating things, I'll die."

Parks says he often wakes up at 3 a.m. with words or music in his head that he's afraid he'll lose if he turns over and goes back to sleep. So he turns on his computer or the keyboard in the fully equipped sound studio in his den and writes or composes till dawn. Then, he says, "I just hope to God nobody calls before noon."

> I could do this, he thought; and he picked up a small Voightlander Brilliant camera at a Seattle hockshop during a layover.
>
> –SMITHSONIAN, APRIL 1989

"But you've already published four autobiographies," I said. "Why another?"

"My perspective keeps changing. I see the same events differently than I did 40 or 50 years ago. I used to write with anger. But success has made my outlook much brighter, and I'm now determined to keep on impressing young black men and women that the color of their skin is no excuse for failure."

Gordon Roger Alexander Buchanan Parks was the 15th and last child born to a dirt-poor farm family in Fort Scott, Kansas. But the world was almost cheated out of him. "When Dr. Cavanaugh took me from my mother's womb, he covered me with a sheet and pronounced me dead," he says. An assistant, Dr. Gordon, however, insisted on trying to revive the limp little body, rubbing it with ice and bluing water used for washing clothes, until as Parks says, "I started hollering. That's how I happened to be named Gordon." (He's uncertain about his middle names, except for Alexander, which was the white family his mother worked for.)

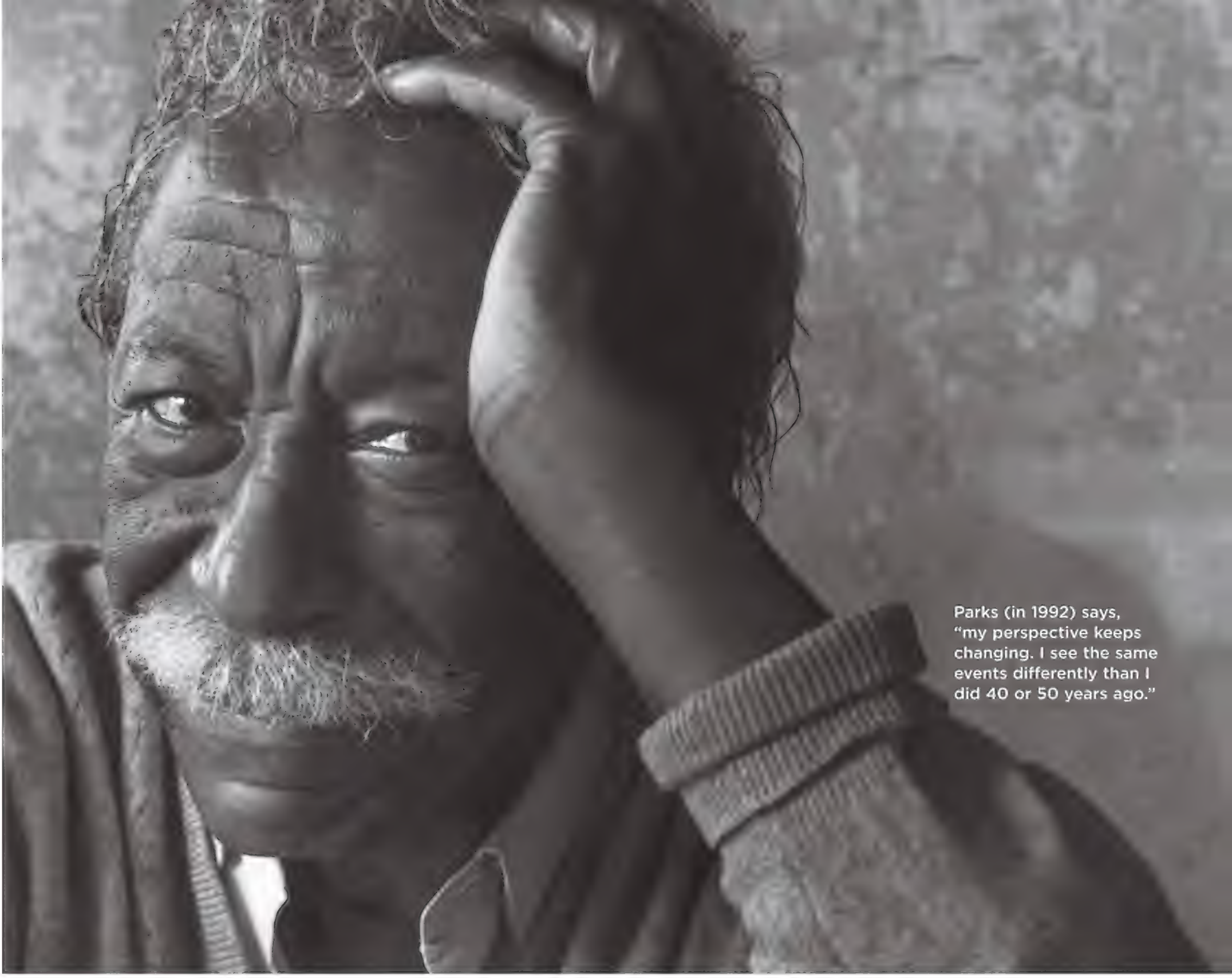
That near-death beginning proved a fitting start to a life at first punctuated with desperate fights for survival. He credits his mother, who died when he was 15, for his perseverance. Once when he asked her, "Do we always have to live in Fort Scott?" she replied, "I don't know, son, but you're to let this place be your learning tree."

Parks called his first memoir, a fictional account of his Kansas boyhood, *The Learning Tree*. The book and subsequent movie directed and scored by him are now considered classics. But it was his second autobiography, *A Choice of Weapons*, that describes how his mother taught him to use love and self-respect against the racism that caused him to be beaten, stoned and called nigger.

After her death in 1928, he followed an older sister to St. Paul, Minnesota. Her hard-boiled husband soon kicked him out of the house, forcing Gordon to spend his nights riding trolley cars back and forth to Minneapolis and scrounging food to continue going to high school. Later, as a self-taught musician, he played the piano in a bordello, eking out just enough tips to rent a room. He worked as a busboy in the Hotel Lowry, a songwriter for Larry Funk's band, a semipro basketball player with the St. Paul House of David ("We beat the Harlem Globetrotters once," he remembers), and as a dining car waiter on the North Coast Limited.

It was on a train that he came across a copy of *Vogue* magazine that inspired him to try fashion photography, a decision that led him to Roy Stryker's talent pool of Farm Security Administration photographers that included Dorothea

ROY ROWAN's latest book, Chasing the Dragon, *recalls his first journalistic assignment—covering Mao Tse-tung's victory for* Life.



Parks (in 1992) says, "my perspective keeps changing. I see the same events differently than I did 40 or 50 years ago."

ARNOLD NEWMAN / GETTY IMAGES

Lange, Walker Evans and Carl Mydans. Working for the FSA, Parks took the photograph he still considers his most important—of a poor black cleaning woman standing with mop and broom in front of an American flag—a pose reminiscent of Grant Wood's *American Gothic*. In 1949 he was hired by *Life*, breaking the color barrier there. His assignments ranged from covering gun-packing Harlem gang members to the stars of Hollywood, where he later became the first black director financed by a major Hollywood studio.

"When I was shooting stories for *Life* or directing movies," Parks says, "black people would look at me, and I knew I was setting an example. It was a tremendous responsibility. If they confided their bitterness to me about life's injustices, I'd say, 'You can fight back. But do it in a way to help yourself, not destroy yourself.'"

Parks' artistic endeavors were often responses to tragedy. The death of his son Gordon Jr. in a plane crash while filming in Kenya inspired a sonata. An encounter with a sick and starving Brazilian boy in Rio's slums inspired a *Life* photo essay and subsequent book, *Flavio*. To memorialize the assassination of Martin Luther King Jr., Parks wrote the music and directed the ballet "Martin." More recently, Pope John Paul's death prompted a poem that will appear in his forthcoming book.

The removal of both Achilles tendons has stopped him from skiing or playing tennis (with Arthur Ashe and Jimmy Connors, on occasion) but has given Parks time for another interest—helping others get started. Recently, a young couple brought him their portfolio of photographs, seeking advice on getting them published. "They were stunning," Parks said. "I wish I had taken them myself. But the accompanying captions were so mundane that I stayed up most of the night writing poetry to go with the pictures, and then faxed the words to them in the morning."

A lot of his work is done at night because of all the daytime interruptions. "Even my three former wives call to tell me they love me," he says. "You see, everybody figures I must be dying, though my doctor assures me I'm going to live to 100. But then I look in the mirror and wonder, what the hell does he know?"

D.A. Henderson

Eradicating one of history's deadliest diseases was just the beginning / **BY ROBIN MARANTZ HENIG**

DONALD AINSLIE HENDERSON, known to his friends as D.A., could never be accused of being wishy-washy. As President Bush's lead expert on bioterrorism—a post to which he was appointed one month after the September 11 terrorist attacks—he used language that government officials rarely do. When the FBI investigated a biologist for transporting infectious organisms in the course of research, he said the bureau had "lost all perspective." He has also spoken out against official policy by urging the destruction of all laboratory stockpiles of the smallpox virus and calling for a reassessment of the international strategy to wipe out polio.

Henderson's iconoclasm arguably led to his greatest accomplishment. Under his guidance, the World Health Organization (WHO) oversaw history's first—and, to date, only—vanquishing of an infectious disease, smallpox.

In its heyday, smallpox was a disease that spread with ease and deadly efficiency, killing a third of its victims. Its human toll dates at least to the time of the Pharaohs; in the 20th century alone, it killed 300 million people and left several million permanently disfigured or blind.

But for all its menace, the smallpox virus had qualities that, as Henderson, 77, recalls, "made this a relatively easy disease to eradicate." The vaccine was effective, long-lasting, relatively cheap, easy to administer, easy to transport, worked with only one dose and required no refrigeration. And smallpox infected only people, meaning that it could not hide out in "animal reservoirs" as so many infectious diseases do, biding its time until encountering an unprotected population.

During Henderson's tenure as WHO's chief medical officer for its global eradication program, smallpox cases were generally limited to Brazil, South Asia and most parts of Africa. WHO workers identified outbreaks readily, because every victim had a visible rash and almost every survivor was left with pockmarks. "If we went into a brand-new area, we could quickly tell whether they had any smallpox there or not," says Henderson. "We could look on the faces of people and know." Most people who were asked "When did you get those scars?" knew the year precisely. A brush with smallpox, he says, "was a very memorable event."

> Henderson's draft board approved a stint with the CDC. "I didn't have to wear a uniform or salute," he says.
>
> –SMITHSONIAN, FEBRUARY 2002

In the late 1960s and early '70s, conventional wisdom held that the way to eradicate a disease was to vaccinate entire populations. But Henderson thought that for smallpox, such a strategy would be expensive, tedious—and unnecessary. Instead, he used an approach known as ring vaccination. When a case was identified, the sick person was isolated quickly, and vaccine was given to all of the patient's primary contacts (relatives, neighbors, co-workers) and secondary contacts (the contacts of the contacts). In this way, outbreaks could be throttled with a vaccination rate of 50 to 80 percent.

The strategy worked. In October 1977, a young man in Somalia named Ali Maow Maalin became the last human

Henderson (in 2002, with a statue from Zaire depicting pockmarks) thought he was done with smallpox when it was wiped out 25 years ago.

REGIS LEFEBURE

ROBIN MARANTZ HENIG is the author of A Dancing Matrix: How Science Confronts Emerging Viruses.

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case of naturally occurring smallpox in the world. (He survived.) In 1980, WHO declared the disease eradicated.

But eradication had a dark side. Now that there's no need to vaccinate anyone, the entire global population is vulnerable to smallpox. This makes the smallpox virus, known as variola, an ideal weapon for terrorists—or any evildoer who could, as Henderson once observed, make up a batch of virus pretty easily in "a good two-car garage."

To prevent this possibility, the WHO has consistently recommended killing off all remaining samples of variola. Only two such stockpiles currently exist, at least officially: one at a high-containment laboratory at the Centers for Disease Control and Prevention in Atlanta, the other in a Russian laboratory in Siberia. But the Clinton administration decided in 1999 not to destroy the CDC variola, a decision that has been reaffirmed by the Bush administration.

Henderson believes that the virus exists outside the two official labs, but he has argued that destroying the Russian and American specimens would send a message to all nations that harboring variola constitutes a crime against humanity.

In 1977, just as smallpox was making its last natural gasp, Henderson became dean of the Johns Hopkins University School of Public Health. He joined the first Bush administration as head of life sciences in the Office of Science and Technology Policy. ("I had to protest that I didn't think I was the right party," says Henderson, a lifelong Democrat, "but they wanted me anyway.") Later, he went head-to-head with the threat of biological terrorism as the first director of the Office of Public Health Emergency Preparedness in the fall of 2001, just in time for the arrival of the anthrax letters.

"I find this unfortunate that we really have to spend as much time and effort as we are, trying to combat diseases in which man is responsible for spreading it," he said at the time in an interview on public television. "There's so much in the way of problems out there, tuberculosis and AIDS and malaria, that I really regard this as a very unhappy kind of interlude in my life to have to revert to this; but I think the problem is so important that as a citizen I just can't walk away from it."

Henderson countered conventional wisdom again in 2002 by speaking out against global efforts to eradicate polio. According to him, such efforts are doomed to fail, in part because the polio vaccine must be administered in five doses to be effective. "I'm afraid eradication campaigns are destined to be on the dusty bookshelves of history," Henderson said to his stunned infectious disease colleagues in a controversial speech while he was at the Office of Public Health Emergency Preparedness. (He left his post in 2004 but still consults for the agency; he is also a resident scholar at the Center for Biosecurity at the University of Pittsburgh Medical Center.) Pointing to the threats to global public health from measles, HIV, tuberculosis and malaria, he said that efforts should focus on prevention and control, not eradication. "I believe there is something to be eradicated," he said, "and that is the word eradication."

Speaking bluntly, it seems, is a tough habit to break.

Renée Fleming

The soprano is renowned for her beguiling voice and presence / **BY STEPHEN HASTINGS**

For well over a decade now, the American soprano Renée Fleming has enjoyed acclaim for a voice unsurpassed in loveliness. It's produced with a degree of technical assurance rare in any singer, combining a densely luxuriant texture with an illusion of weightlessness. The sound floats with stunning ease and maintains a beguiling softness throughout a three-octave range. Though climaxes can be thrilling (the B flat of her signature aria, the "Song to the Moon" from Dvorak's *Rusalka*, has been described by Fleming as her "money" note) and spectacular (she delights in showing off a range that extends well above top C), there is never any hardening or loosening of the sound under pressure.

Her repertoire extends to nearly 50 operas, ranging from Handel to André Previn's *A Streetcar Named Desire* (composed especially for her in the 1990s). But perhaps her most successful roles—apart from Dvorak—have been in operas by Mozart, Massenet and Richard Strauss. These benefit from her limpid tone and her sensual stage presence. Her acting is impressive, and it draws from many sources. Her portrayal in Paris of Massenet's *Manon*, in 2001, arguably owed as much to Marilyn Monroe as to the theatrical traditions of the Opéra Comique, but was irresistible. In Mozart her approach is more restrained if no less rich (Donna Anna's recitatives in Act One of *Don Giovanni* are as revealing in facial expression as they are vocally compelling). And Fleming seems totally at home with Strauss: subtle in gesture, eloquent in diction and effortless in sustaining the highest-lying phrases. Seeing and hearing her in these roles is one of the great operatic experiences of our day.

Among Fleming's earliest memories is that of listening in her playpen to her mother giving singing lessons—"the work that went into making a beautiful sound." Fleming, whose father was also a music teacher, grew up in a suburb of Rochester, New York, in the 1960s—a time when beautiful sounds were not necessarily a priority in classical music; many composers explicitly rejected them, along with the pleasure principle that underlies them, as emotionally and ideologically suspect. And the fact that Fleming took a relatively long time to

Editor of Italy's classical music magazine Musica, *STEPHEN HASTINGS is also the Italian correspondent for* Opera News.

"Music is about floating and soaring," says Fleming (in 1999 in Paris). "It wants to bend and be fluid. . . . I like curves, not jagged edges."

JOHN STODDART / DECCA CLASSICS

Holiday and Joni Mitchell, among others.) While studying at the State University of New York in Potsdam in the early 1980s, she developed her improvisational skills and vocal range by singing jazz. It was an experience that has influenced her phrasing in Handel and operas by Rossini, Bellini and Donizetti—operas that depend on the creative intervention of the artist, who is free to embellish the melodic line and play with rhythm to suit the character. Fleming has not always enjoyed unqualified triumphs in these works, but she clearly relishes the challenges they offer.

Nothing exposes a voice like a recital with piano accompaniment, and Fleming's increasing devotion to this medium is further proof of her technical mastery and command of nuance. What Tim Page of the *Washington Post* has described as her "magnificent way with a song" is as evident in the works of Duke Ellington as in those of Debussy. Her commitment to her two young daughters (she and actor Rick Ross divorced a few years ago) and desire to reach wider audiences have motivated her recent favoring of concert engagements over operatic productions, which require a lot more travel and many months away from her family. "My children need me at home now more than ever," she says. "With a season solely in opera, I can reach audiences in only five or six cities a year, whereas with a recital tour I can reach many more people in less time."

> Her voice has a limpid, matchless brightness that can bring goose bumps. It is an arresting voice. . . . —SMITHSONIAN, JUNE 1992

gain full confidence in her voice (she was 29 when she made her major debut, as the Countess in Mozart's *Le Nozze di Figaro* at the Houston Grand Opera in 1988) may have had something to do with that climate. She says she was obsessed, early on, with the "jagged" lines sung by Anne Trulove in Stravinsky's *The Rake's Progress.* That view stands in marked contrast to her later feeling, expressed in a 2002 interview, that "music is about floating and soaring; it wants to bend and be fluid. I avoid heroic pieces; I like curves, not jagged edges." This latter view reflects to perfection the characteristic sensuousness of her phrasing today.

Fleming's singing is healthily heterogeneous in inspiration, combining an awareness of 18th- and 19th-century performance practice with a sensitivity to 20th-century popular singing styles. (She says she has long admired Billie

At age 46, she says she intends to focus "on deepening the interpretations of roles I have already sung, with a few new additions" to her repertoire. And she looks to the future as "the most creative period of my life, now that the nuts and bolts of building a career and a technique are largely behind me." If she's correct, the next decade should prove to be as life-enhancing for her audiences as for the singer herself.

David Attenborough

The natural history filmmaker has brought serious science to a global audience / **BY FRANS LANTING**

I WAS DRIVING DOWN a dirt road looking for a sheep ranch on the coast of western Australia, trying to find a place to photograph stromatolites, living reefs of ancient blue-green algae that occur in only a few places on earth. A friend of a friend had recommended the ranch, but the description was a bit vague. As I pulled up to a cluster of old buildings, a tall, bowlegged man came out with a guestbook for me to sign, and when I saw David Attenborough's name in the book, I knew I had come to the right place.

Filmmaker David Attenborough has left his mark all over the planet in his more than 50 years of travel in the service of natural history. He has been a defining force in nature television programming, bringing science to a global audience, while setting high standards for the profession. "It's easy to become a celebrity on television," says BBC producer Alastair Fothergill, who has worked with Attenborough for more than 17 years. "It's much harder to be respected by your peers at the same time. And David succeeds brilliantly at both."

Attenborough is best known for his epic documentaries "Life on Earth," "The Living Planet" and "The Trials of Life," but these productions were rooted in a long and distinguished career with BBC TV as a producer, director, writer, editor, anchorman and executive. When Attenborough joined the network in 1952, natural history programs were rare. His first, a studio quiz show called "Animal, Vegetable, Mineral?" was followed by "Zoo Quest," a decade-long series that took him to exotic locations around the world to cover animal-collecting expeditions for the London Zoo. Later, as head of BBC Two, he commissioned a range of innovative programming, from highbrow series such as Kenneth Clark's "Civilisation," Jacob Bronowski's "The Ascent of Man" and Alistair Cooke's "America," to popular entertainment, including "Monty Python's Flying Circus."

> "Man's passion to communicate and to receive communications seems as central to his success as a species as the fin to the fish or the feather to the birds." –DAVID ATTENBOROUGH, SMITHSONIAN, NOVEMBER 1981

It was "Civilisation," a multipart series with a charismatic host filmed on location, that was the model for Attenborough's own "Life on Earth." He wrote the outline for all 13 parts in longhand, but it took a team of producers, dozens of cameramen, three years of filming, and the vast resources of the BBC to execute his vision. "To put out something with such an ambitious story line was new," he says. "I would start a sentence of my narration in one location and finish it off halfway around the world. People said it would never work—that viewers would not be able to follow it. But it did work, and I've produced variations on this approach ever since."

The series made Attenborough a global personality. "He has a unique ability as a storyteller and communicator," says Attenborough's BBC colleague Mike Salisbury. "We assemble reams of information, and he has this incredible ability to pick out the stories that really capture people."

"Life on Earth" became a template for more than half a dozen subsequent productions, from "The Living Planet" (1984) to "The Life of Mammals" (2002), each more ambitious than the last. "He's been an inspiration to several generations of people who have entered the fields of biology, conservation or filmmaking," says Salisbury.

Producer Alastair Fothergill was one of those individuals. "When I was a teenager I saw 'Life on Earth' and became absolutely determined to get into this profession myself," he says. He worked with Attenborough in locations around the world, but he remembers a defining moment in Ivory Coast that involved an exhausting pursuit of a group of chimpanzees. "David was in his 60s, but he kept the pace, and we caught up with the chimps in time to witness them killing a monkey. It was one of the most horrific things I've ever experienced in nature. We were panting with exhaustion, but we had only one minute to record David's commentary. He looked to the camera, and on the spot he turned a story of violence in nature into a comment on the origins of cooperative behavior in humans."

Attenborough, who at age 79 still writes, edits and directs, worries that computer imaging is blurring the lines between reality and fiction. "I fear that we are driven toward ever more sensationalism in nature programming," he says. "But I firmly believe that the art of storytelling will never change. If you tell a good story, people will hang on your words."

Nature photographer FRANS LANTING*'s newest project is a book titled* Life, A Journey Through Time*, due out next summer.*

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"I know of no pleasure deeper," says Attenborough (with Macaroni penguins on the island of South Georgia in 1992), "than that which comes from contemplating the natural world and trying to understand it."

Tim Berners-Lee

First he wrote the code for the World Wide Web. Then he gave it away / **BY TOM STANDAGE**

"The Web is not done," says Berners-Lee (in 1997), who hopes to make it more of a two-way medium.

THE ORIGINS of great inventions are generally more complicated than they appear. Thomas Edison did not make the first light bulb, nor did Samuel Morse build the first electric telegraph. Yet in the case of the British scientist Tim Berners-Lee, the story is unusually straightforward. In the fall of 1990, he wrote some software with the aim of making it easier for particle physicists to share their results by interlinking documents on different computers.

Of course, the idea of "hypertext"—linking a word or phrase in one document to another document—was not new. Commentaries on the Torah and even the notebooks of Leonardo da Vinci take the form of hypertexts. Much later, once the computer age began, visionaries including Vannevar Bush and Ted Nelson proposed elaborate hypertext systems. But Berners-Lee actually implemented his scheme in working software and then released it into the world. He considered calling it Information Mesh, or Mine of Information, but eventually settled on the name World Wide Web.

At the time, Berners-Lee was working at CERN, a physics laboratory in Geneva, Switzerland, and he first made his new software available to other physicists. A few months later, in the summer of 1991, he made it freely available on the Internet. And the rest is historic: the Web became the accessible face of the Internet and now consists of billions of pages. Yet beneath modern adornments such as animations and video clips, all those pages still rely on conventions (such as "http," "html," and so on) that Berners-Lee came up with 15 years ago.

Like the Internet that underpins it, the Web has flourished because of its openness and its creator's deliberate decision not to predict or prejudge how it would be used. As the Web took off, there was a debate within CERN about whether to try to profit from it. Berners-Lee argued strongly against this idea: without an open standard, he reasoned, there would end up being several incompatible forms of Internet media, backed by Microsoft, AOL and others. Making the Web royalty-free made it more attractive than any proprietary alternative. "Without that, it never would have happened," he says.

> At first, he was just noodling around, trying to find a way to organize his research files. —SMITHSONIAN, SEPTEMBER 2003

While the benefits of openness were clear to him, Berners-Lee did not foresee the many ways in which the Web would be used. He first realized the extent of its potential in the summer of 1993, the day he began using a large color monitor. As he was browsing the Web, still in its infancy, he stumbled upon a Web-based exhibit of Renaissance art from the Vatican, based on images posted on-line by the Library of Congress, wrapped up in a few simple Web pages by a Dutch programmer. As a colorful illuminated manuscript unfurled on his screen, Berners-Lee says, it took his breath away. Not only was it beautiful; it also demonstrated the Web's power to promote international collaboration and sharing.

TOM STANDAGE lives in London. He is the technology editor of the Economist *and the author of* The Victorian Internet.

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Berners-Lee, 50, is now based at the Massachusetts Institute of Technology, where he continues to defend the Web's founding principle of openness as the head of the W3C, the Web's standards body. Though modest and soft-spoken, he is also charming and persuasive, which makes him the ideal person to steer the Web's development and ensure it remains open.

To have changed the world once would be enough for most inventors, but Berners-Lee still regards the Web as a work in progress. "The Web is not done," he says. One area where there is room for improvement is in making the Web a two-way medium, as it was in its earliest days: the original Web browser was also an editor (it not only displayed pages, but also let the user alter them), but this feature was not included in subsequent browsers as the Web went mainstream. Berners-Lee regards the current mania for Weblogs (on-line journals) and wikis (pages anyone can edit) as a step in the right direction. "One of the things that makes wikis and blogs attractive is that everybody is able to express themselves," he says. But there is still room to make them easier to use, he believes.

Most of his effort is now devoted to creating a "semantic Web," in which documents on the Web make sense to machines as well as people. At the moment, a page containing a weather forecast, for example, can be understood by a human, but is merely numbers and letters to a machine.

The semantic Web involves labeling information on Web pages and in databases with "metadata"—data about data—saying what it is. This would make novel forms of searching possible and would even allow software to make deductions using retrieved information. The W3C approved the required standards last year.

Just as the Web was first adopted by particle physicists in 1991, the semantic Web seems to be taking root initially in the life sciences. In a field that faces daunting data-management challenges and where a lot of money is at stake, Berners-Lee says, the technology allows disparate databases of genomic information to be tied together seamlessly and searched in clever new ways. But it will be harder for the semantic Web to reach critical mass than it was for the Web, he admits, since it is difficult to demonstrate its benefits until the metadata is in place.

Won't that mean rejiggering all of today's Web pages? Not necessarily. Many Web pages are generated on the fly from databases, so adding metadata labels is simply a matter of changing the wrappers put around the data. And large software vendors, which have pooh-poohed the idea of the semantic Web for several years, have recently begun to change their view. "They have started to understand it," Berners-Lee says.

It is an enormously ambitious scheme: an attempt not just to make information available, but to organize it too. Back in 1991, however, the idea that the Web would become what it is today seemed just as implausible. So perhaps lightning will strike twice after all.

James Watson

After DNA, what could he possibly do for an encore? / **BY HORACE FREELAND JUDSON**

FRANCIS CRICK died in July 2004, age 88. Maurice Wilkins died two months later, age 87. In Stockholm in December 1962, Crick, Wilkins and James Watson had shared the Nobel Prize in Physiology or Medicine for the discovery nine years earlier—as all the world knows—of the structure of deoxyribonucleic acid, DNA, the stuff that genes are made of. Another scientist should have been on that platform, Rosalind Franklin, who died in 1958, age 37. Her meticulous experimental work in 1952 had supplied the essential X-ray-crystallographic data that Watson and Crick used, without her knowing at the time, to get out the structure. Nobel prizes are never awarded posthumously; Wilkins was in effect her stand-in. To be sure, a score of others contributed bits and pieces of evidence and technique, but Watson and Crick were the ones who put it all together, literally, to build the model of the double helix. It was a discovery unique in its centrality and explanatory power, the most important in the history of biology. Of all those involved, that golden generation, Watson at 77 is the last man standing.

Watson and Crick: the two are forever twinned and defined by that discovery—and by each other. Crick went on in science, playing a crucial role as theorist and generalissimo in the discovery of transfer RNAs—molecules that help assemble protein chains on the instructions of DNA—and especially in deciphering the genetic code. In the 1970s, he switched to neurobiology and attacked the problem of consciousness.

> "We have to reassure people that their own DNA is private and no one else can get at it." –JAMES WATSON, SMITHSONIAN, FEBRUARY 1990

Watson continued at the bench in molecular biology for a while, with some relatively minor successes. After the Nobel Prize, his name has appeared on no more than three research papers. This has been due in part to his honorable and refreshing rejection of the widespread practice whereby senior scientists supervising research of juniors list themselves on resulting pa-

HORACE FREELAND JUDSON is the author, most recently, of The Great Betrayal: Fraud in Science.

BURT GLINN / MAGNUM PHOTOS

Watson (at age 58 in 1986) is now a kind of senior statesman for science—as well as its most outspoken critic.

pers as authors when in fact they have done none of the work. More deeply, though, Watson was creating a new and strenuous mode of doing science.

In the fall of 1973 he told me, "People always ask me, are you doing science, are you doing experiments, and I say no, and then they seem to think that that's terrible and that I should be very unhappy, but I'm really not unhappy at all. The thing that makes me happy is just the appearance of new science." He had spent two years at the California Institute of Technology after the great discovery, then had been called to Harvard. In 1968, part time at first, he took on the directorship of the Cold Spring Harbor Laboratory, a nonprofit biology research facility on the north shore of Long Island, hard by Oyster Bay and the estates of serious old money.

Unquestionably, Watson, when doing science at his best, deployed a kind of intuitive brilliance, including (I infer) vivid spatial visualization. "Jim dreams his science"—thus the evocative judgment of the great and humane French microbiologist André Lwoff, himself a laureate, in a magisterial review of Watson's memoir of the great discovery, *The Double Helix*. He has a difficult personality, strenuously self-centered, often rude to an extreme, yet he has the virtue of his vices: he says exactly what he thinks and his be-damned-to-you honesty excoriates crappy science and scorns slovenly, hypocritical, self-serving attitudes toward the societal consequences of science. He's proud of it. He told an interviewer in 1991: "I guess I'm best known for just saying things the way I think they are under circumstances where you're not supposed to say it."

With all this, though, Watson has a further trait, central to his way in the world though rarely remarked: an extraordinary skill in getting on with older or more senior men who can promote his objectives, most famously the two who influenced him profoundly, Max Delbrück and Francis Crick. Delbrück was a German quantum physicist, a follower of Niels Bohr, who came to the United States in 1937 and turned to the genetics of the simplest microorganisms. With an intellect and a personal style austere, rigorous, demanding, attractive, he was Watson's mentor and patron beginning in the late 1940s. Watson revered him. Crick was the elder by 11 years and the product of a sophisticated European culture, brilliant, assertive, above all socially urbane and sexually successful in ways the gawky post-adolescent deeply envied. In the days of their collaboration, Crick (after Delbrück) was the one against whom Watson measured himself, whose approval he strove to gain.

After the Nobel, even as he left Harvard, Watson was turning himself into an effective, irascible organizer and spur of research in molecular biology. His first book was *Molecular Biology of the Gene*, a textbook that has gone through many editions. Then in 1968 came *The Double Helix*, awkward, jolting, intensely personal, a bestseller and a unique classic. Those who have read the book may want to think of it as Jim's working-through of his relationship to Francis, a testimonial and a declaration of independence. That year, also, he married Elizabeth Lewis: they have two sons.

Cold Spring Harbor has been Watson's other great passion. When he first went there, as a graduate student in 1948, it was a bucolic summer camp for biologists, particularly beloved of Delbrück and his colleagues and acolytes. When he became director, two decades later, its finances were desperate. He rescued it, he renovated it, and in nearly 40 years he has built it into a world-renowned science factory. His Nobel, his world standing, his volatile eccentricities have attracted donations of land, of bold modern buildings and high-tech laboratories, of endowment. The place now runs graduate and specialized technical courses, and upwards of 60 meetings and an annual symposium. Cold Spring Harbor Laboratory Press brings out textbooks, monographs, essential advanced laboratory manuals, and occasional trade books (including, by way of disclosure, the latest edition of my own *Eighth Day of Creation: The Makers of the Revolution in Biology*).

From his base at Cold Spring Harbor, Watson became perhaps the most powerful—cer-

"I have never seen Francis Crick in a modest mood," Watson (with Crick, left, in Cambridge in 1953) once wrote.

A. BARRINGTON BROWN / PHOTO RESEARCHERS

tainly the most outspoken—promoter and critic of the enterprise of the sciences in the United States in his day. He has written constantly, articles addressed to scientists and policymakers and to the public in the *Atlantic*, the *New Republic* and the Op-Ed page of the *New York Times*. He has spoken out contentiously, particularly in defense of research on recombinant DNA (what used to be called genetic engineering) and the human genome project and its applications.

In 1988, he became the first director at the National Institutes of Health of their component of the genome project. Three years later, he told an interviewer, "When I took the job in Washington I suddenly had to have a press conference and without thinking I said, 'We're going to spend three percent of our money on ethics.'" That became the Ethical, Legal and Social Issues Research Program (ELSI), and the amount grew to 5 percent of the NIH genome budget. "Probably the wisest thing I've done over the past decade," he said.

ELSI is emblematic of Watson's convictions. These are rooted in his childhood, a strongly left-liberal Democratic family in Depression-era Chicago, angered by social injustice. He is an obdurate atheist (as was Crick). He quit the genome project in 1992, over a dispute on principle with the then director of NIH, Bernadine Healey. He continues to speak out. "I've gone out of my way to emphasize that we've really got to worry that a genetic underclass exists," he has said. "I think our biggest ethical problem is people won't use the information we get, and I think that's just as bad, to let a child be born with no future—when their parents certainly would have not wished to have such a child but had not been genetically tested to show the risk. I think that's totally irresponsible." He has angered antiabortionists and appalled those on the left who think him a neo-eugenicist. Yet he has battled for the strictest privacy of genetic information. He has also said: "I think all genetic decisions should be made by women, not the state, not their husbands, just by women, because they're going to give birth to those children, and they're going to be the ones most responsible."

In 1993, at 65, he relinquished the directorship at Cold Spring Harbor and had himself boosted to president. About that time, an interviewer asked the banal question, What new projects are you taking on? He replied sardonically, "Oh, I'm too old to start anything new. I'm trying to improve my tennis game." In 1999, the program of advanced courses at Cold Spring Harbor gained New York State accreditation to grant doctorates. The Cold Spring Harbor Laboratory Watson School of Biological Sciences graduated its first PhDs (14 of them) in June 2004, the man himself leading the academic procession as chancellor in the full regalia that he had specified.

A cult of personality has bloomed around Watson at Cold Spring Harbor. Crick, for one, recognized this, with some regret. Yet there is a personality, one of the most vivid, unpredictable, effective and memorable in the long history of science. It is to be celebrated. But stand back.

Wes Jackson

In Kansas, a plant geneticist sows the seeds of sustainable agriculture / **BY CRAIG CANINE**

WES JACKSON is a large man with the metabolism of a hummingbird. This is a good thing, because a commanding physical presence and oodles of restless, probing energy are likely prerequisites for the job Jackson has carved out for himself: nothing less than the overthrow of agriculture as we know it.

Farming, in Jackson's view, is humanity's original sin. This fall from grace occurred around 10,000 years ago, when people first started gathering and planting the seeds of annual grasses, such as wild wheat and barley. "That was probably the first moment when we began to erode the ecological capital of the soil," he says. "It's when humans first started withdrawing the earth's nonrenewable resources." As he sees it, fossil-fuel dependency, environmental pollution, overpopulation and global warming are all extensions of the path humans took when they first started tilling the soil. "It wasn't intentional. It didn't require a chamber of commerce or the devil to make us do it—we just did it."

Jackson, 69, has spent the past 29 years blazing a path to redemption. After earning a PhD in genetics from North Carolina State University, he abandoned a tenured faculty position at California State University at Sacramento in 1976 to return to his native Kansas. There, near Salina, he co-founded the Land Institute, a nonprofit educational and research organization. "The Land," as its many devotees call it, is equal parts plant-breeding station, teaching hub and intellectual center for what Jackson terms "natural systems agriculture." The first commandment of his creed is to mimic nature, rather than dominating or ignoring it. "Our beginning point is to look at nature's ecosystems and how they worked for millions of years," he says with a resonant Kansas drawl. "Where they're still in existence, natural ecosystems recycle soil nutrients and run on sunlight. They almost always feature perennial plants in mixtures: agriculture reversed that."

To reconcile agriculture with nature's perennial example, researchers at the Land Institute have toiled since 1978 to create a kind of botanical chimera: plants that look, above ground, much like annual crops, such as sorghum and sunflowers. Below ground, however,

CRAIG CANINE is the author of Dream Reaper, *an account of the development of a revolutionary new high-tech harvester.*

they have deep, perennial root systems, like those of the mixed wild grasses and legumes that carpeted the Midwest and Great Plains before the plow came and turned the prairie upside down. This is no small feat of gene-jockeying. In mainstream plant-breeding, developing a routine new wheat variety (a minor genetic variant that has, say, higher yields than similar varieties under drought conditions) takes about 10 to 15 years. What the Land Institute's breeders are trying to accomplish is a good deal more ambitious than that. They began by taking wild prairie species, such as a legume known as Illinois bundleflower, and trying to make them more like domestic crops, with large, abundant seeds that remain on the plant until harvested. About five years ago, the breeders also began pursuing a parallel strategy—crossing annual crops like wheat and sunflowers with wild relatives to create perennial hybrids.

"We have sort of a crash program to develop these crops—if you can have a crash program that's going to take decades," says Stan Cox, the Land Institute's director of research. "The timeline we're working on shows us having a set of perennial grain-producing crops that would be usable in agriculture somewhere between 25 and 50 years from now." These next-generation crops would recycle soil nutrients, sharply reducing the need for fertilizer. More important, the perennials' deep roots would remain, anchoring topsoil; only crop-bearing stalks would be harvested.

Jackson (at the Land Institute in Salina in 2005) focuses his work on "nature's ecosystems and how they worked for millions of years."

JIM RICHARDSON

Can they do it? "From a plant-breeding standpoint, it's likely that what they're trying to do is indeed possible," says Charlie Brummer, a plant geneticist at Iowa State University. "But it will take a long time. The question is, can they keep it up for that long?"

> In Jackson's vision, future cultivated fields would build and hold topsoil rather than losing it to wind and runoff.
>
> —SMITHSONIAN, APRIL 1990

Jackson is doing his best to see that they can. Since he last appeared in these pages 15 years ago, his role has shifted from hands-on researcher to globe-trotting visionary. "The difference between 1990 and now," he says, "is that then, we were focused on identifying the necessity" for fundamental change in agriculture. "We've done that. Now, an increasing number of people are acknowledging that necessity."

And acknowledging his tireless evangelism. In 1990, he was named a Pew Scholar in Conservation and the Environment. He received a MacArthur "genius" award in 1992, and in 2000, a Right Livelihood Award—the so-called "alternative Nobel Prize" presented annually in Sweden.

Broader recognition has allowed the institute to establish what may be its best survival insurance: a graduate fellowship program that attracts young academics from universities across the country. Each year, the program receives around 40 proposals, typically projects on ecology or plant breeding that involve diverse perennial crop species, of which the Land Institute funds eight or nine. "By providing seed funding," Jackson says, no pun intended, "we leverage the research funding of institutions with larger budgets. So far, we have 18 or 20 graduate fellows out there spreading the Land Institute virus, in hopes that they can overcome the agricultural establishment's immune system." He erupts with deep belly laughter that reveals, as plainly as anything else, the good-humored iconoclasm that has struck so deeply at the roots of our most basic need—to eat.

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Maya Angelou

By singing of her own hardships, she has given strength to others / **BY RICHARD LONG**

MAYA ANGELOU'S signature book, *I Know Why the Caged Bird Sings*, burst upon the American literary landscape in 1969, becoming an immediate bestseller. It has retained its position as a treasured work in the past 36 years, capturing the loyalty of successive generations of readers, remaining a constant recourse for those who early on were enraptured by its story of a girl growing up in rural Arkansas amid the tensions of America's black-white divide. Her memoir is a narrative of the ability of the human spirit to surmount adversity.

The title of the book comes from the poem "Sympathy" by the late 19th-century poet known as the poet laureate of African-Americans, Paul Laurence Dunbar. The poem is a meditation on the struggles of a bird to escape its cage, an analogy frequently invoked to describe an oppressed people. It also speaks to the supposed contradiction of the bird singing in the midst of its struggle.

Angelou became a member of the Harlem Writers Guild a decade before *Caged Bird* was written, but her focus had been poetry and drama. The book grew less out of the literary ambitions of its author than out of her marvelous skills as a raconteur. So profoundly did these impress her friend James Baldwin that he urged her to write an account of her childhood in Stamps, Arkansas. At first she resisted, not wishing to interrupt her poetry or playwriting, but challenged by the hint that perhaps she lacked the skill to transpose her scintillating oral narration to print, she produced *Caged Bird*.

> "The writer has to take the most used, most familiar objects—nouns, pronouns, verbs, adverbs—ball them together and make them bounce. . . ."
> –MAYA ANGELOU, SMITHSONIAN, APRIL 2003

Angelou continued the narrative of her quest for fulfillment and completion in a succession of books that have established her as a major autobiographical voice of the time. Sixteen years elapsed between the fifth and the sixth and final volume of the series, *A Song Flung Up to Heaven*, which appeared in 2002. It takes the protagonist to the threshold of her literary career, ending with her picking up the pen to begin writing *I Know Why the Caged Bird Sings*. Angelou explains that writing the most recent book took so long because of the painful journey it required her to relive: through the years of the civil rights struggle and the traumatic assassinations of Malcolm X and Martin Luther King Jr., with both of whom she had established ties. The book's title takes us back to Dunbar's poem, whose closing lines are:

It is not a carol of joy or glee,
But a prayer that he sends from his heart's deep core,
But a plea, that upward to Heaven he flings—
I know why the caged bird sings!

Angelou has been nurtured by poets and poetry since her earliest years. A moving evocation of this reality was presented in a "conversation" between her and her son, Guy Johnson, a poet and novelist, in July 2005 at the National Black Arts Festival in Atlanta. Mother and son reminisced, quoted poems, and remembered specific occasions when poets and poems provided inspiration and solace.

An epochal moment in the creative life of Maya Angelou, who had become by the early 1990s one of the most recognizable Americans, was the invitation to write and deliver a poem at the inauguration of William Jefferson Clinton as president of the United States. Angelou and Clinton share a rural Arkansas background; her childhood home, Stamps, is about 25 miles from Clinton's hometown, Hope. During a crossing of their paths during the 1992 electoral campaign, Clinton greeted her as "homegirl." Standing in a cold winter wind on January 20, 1993, before the national capitol, the "homegirl" read her poem "On the Pulse of Morning."

Angelou delivered a second "public" poem—"A Brave and Startling Truth"—at the commemoration of the 50th anniversary of the United Nations in June 1995. Regarding the human race "on a small and lonely planet," it concludes:

When we come to it
We must confess that we are the possible
We are the miraculous, the true wonder of this world
That is when, and only when
We come to it.

RICHARD LONG authored The Black Tradition in American Dance *and* Grown Deep: Essays on the Harlem Renaissance.

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Her books and inaugural poem brought Maya Angelou (in 2005) fame, but she's also been a dancer, singer, composer, actor and director.

Yo-Yo Ma

Humanitarian, globe-trotting teacher, good sport, ice-dancing fan and heckuva nice guy. Oh, and he plays the cello / **BY JOSHUA KOSMAN**

IF YO-YO MA DIDN'T EXIST, no novelist in the world would have dared invent him. The combination of virtues—musical, intellectual, personal—is simply too implausible.

I suppose readers would believe a fictional character who was one of the finest cellists in the world—after all, somebody has to be—and they would likely accept the idea that gorgeous tone, impeccable technique and boundless interpretive sophistication are all necessary parts of that designation. They probably wouldn't even balk at a performing repertoire that included standard masterpieces, newly commissioned classical works and a host of cross-cultural and interdisciplinary projects. But to go a step further and claim that this artistic paragon was also the nicest person in the classical music business—universally renowned for his modesty, amiability and collegial spirit—would be pushing credulity.

And yet it's all true. At 50, Ma has established himself as an instrumentalist of extraordinary technical gifts and expressive directness. But he is also a reminder that musical excellence can coexist alongside prodigious human decency. In Ma's case, these are not distinct attributes. His personal warmth and generosity inform his playing, making every performance a richly human interaction with his listeners. In addition to being a solo virtuoso, he is a committed chamber player and artistic partner; his collaborations with his longtime duo partner, the pianist Emanuel Ax, and with artists from all parts of the musical and cultural spectrum—even ice dancers—are notable for their easy give-and-take. Ma boasts a megawatt smile and a lack of self-importance that would seem disingenuous in a lesser artist. He has been one of *People* magazine's Sexiest Men of the Year, bantered with the Muppets on "Sesame Street" and seen his name serve as a punch line on "Seinfeld."

But Ma isn't celebrated simply because his name can raise a laugh when spoken in conjunction with that of Boutros Boutros-Ghali. It's because he can make music the universal language that it's sometimes claimed to be. His performances of the cornerstones of the cello repertoire—beginning with Bach's Six Suites for Unaccompanied Cello and continuing through the major showpieces by Schumann, Saint-Saëns, Tchaikovsky, Dvorak, Prokofiev and Britten—combine technical razzle-dazzle with plain-spoken eloquence. When he plays Bach, you hear the composer's profundity, but you also hear what so many performers miss—the buoyant dance rhythms, the ingenuity and the sense of fun.

> "If I know what music you love, and you know what music I love, we start out having a better conversation."
>
> –YO-YO MA, SMITHSONIAN, JUNE 2002

And unlike many classical virtuosos whose careers are devoted almost exclusively to the same small circle of recognized masterpieces, Ma's musical interests

A prodigy who played for President Kennedy at age 7, Ma (in 1988) is no snob, performing Bach to pop to tangos.

WILLIAM COUPON

JOSHUA KOSMAN is the classical music critic for the San Francisco Chronicle.

extend far beyond the tried and true. Among his more than 50 recordings are discs devoted to Argentinian tango and Brazilian dance music, collaborations with country crossover artists Mark O'Connor and Edgar Meyer, movie soundtracks, and a wide range of contemporary classical music by such composers as Tan Dun, Philip Glass and Peter Lieberson.

Since 1998, Ma has devoted much of his attention to the Silk Road Project, which he launched to explore and celebrate the music of civilizations in Asia, Europe and the Middle East. Named for the legendary network of trade routes that once extended from China across the Asian subcontinent to the Mediterranean, the project offers newly composed and traditional music that blends strains from Iran, Turkey, Azerbaijan, China, Mongolia and more. The project, which was the centerpiece of the Smithsonian's 2002 Folklife Festival, has spawned a flurry of performances, recordings and educational programs by the Silk Road Ensemble—a collective of musicians in which Ma, characteristically, serves as but one among equals.

Ma was born in Paris in 1955 to Chinese émigré parents, both of them musicians. The family moved to New York City in 1962. He and his older sister, Yeou-Chang, who plays the violin, were both prodigies—the two performed that year before President Kennedy and the first lady—but, still, Ma came slowly to the life of a professional musician. He studied humanities at Harvard, and although he had kept up his musical pursuits at the Juilliard School of Music and the Marlboro Music Festival while in his teens, it wasn't until after he graduated from college in 1976 that his career began in earnest.

Ma's technical brilliance and his insatiable curiosity about the entire range of musical experience quickly paid off. It took him only a few years to master the standard cello repertoire, after which he set out to create new worlds to explore. He commissioned concertos from composers as diverse as the modernist Leon Kirchner (a mentor from his Harvard days), the neo-Romantic Richard Danielpour and the film composer John Williams. He collaborated on a series of short films based on the Bach Suites with artists such as choreographer Mark Morris, filmmaker Atom Egoyan and ice dancers Torvill and Dean.

I've heard Ma perform countless times, and each occasion was an event to be cherished. But my favorite memory of him comes from a 1990 appearance with Bobby McFerrin and the San Francisco Symphony. Ma and McFerrin improvised together, and the two got on splendidly. Then, after intermission, McFerrin led the orchestra in Beethoven's Seventh Symphony—and there was Ma, sitting in the back row of the orchestra's cello section, playing along and grinning like a kid who'd just slipped past the guards at the ballpark and positioned himself behind third base. By any reckoning, he should have been relaxing in his dressing room or heading back to the hotel. But there was music going on, and he couldn't stay away.

Dan Janzen

A butterfly expert wants more people to read the book of life / **BY JERRY ADLER**

HOW MANY of the trees on your block can you name? How many different kinds are there, in fact? In Daniel H. Janzen's backyard, the 378,000-acre Area de Conservación Guanacaste (ACG) in northwestern Costa Rica, there are around 3,000 species of trees, 950 vertebrates (half of them birds), 130-odd Sphingidae moths and 50,000 fungi—all told, some 235,000 different species above the level of bacteria. Janzen's ambition is to know them all. Not only their names, but their life histories, their interactions and relationships, symbioses and parasitisms, tricks of mimicry and camouflage. Janzen estimates he can keep some 10,000 species straight in his memory, and at age 66, he says every new one displaces something else.

The Guanacaste preserve embraces the four major tropical ecosystems—coastal marine, rain forest, cloud forest and dry forest—plus the intergrades in between, each with distinctive faunas. Janzen, who's spent four decades studying in the area, says scientists can read the totality of its fauna and flora only at a first-grade level. "There's no reason why we couldn't someday get to the level of Shakespeare and the *Wall Street Journal*," he adds. "But that still leaves a lot out."

> He is a theoretical Johnny Appleseed, "planting more ideas than a hundred other biologists." –SMITHSONIAN, DECEMBER 1986

The dry forest—the area west of the Cordillera Guanacaste, sheltered from the wet Atlantic trade winds, with an annual dry season lasting six months—is a habitat that he believes has almost ceased to exist as wilderness anywhere in the world. Although deciduous forest once covered two-thirds of the land area of the tropics (not counting deserts), almost all of it has been cleared by people for agriculture. In 1985, Janzen and his wife, Winnie Hallwachs—both University of Pennsylvania biologists—set about raising money to help build the ACG by putting together small national parks and a patchwork of played-out farms and ranch land. "We left the ivory tower to do something in the world," he says—although they retained

JERRY ADLER is a senior editor of Newsweek.

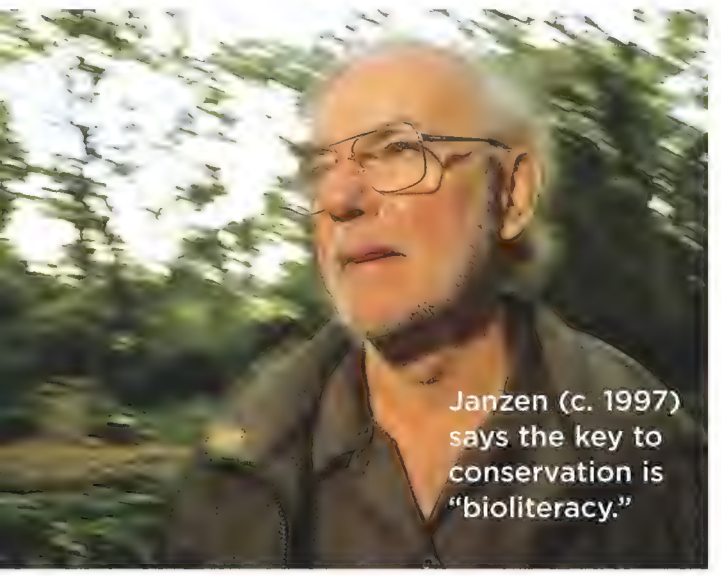
PETER C. POULIDES

Janzen (in Costa Rica in 1986) has worked to preserve large forest tracts because species are "disappearing before our eyes," he says.

their positions at Penn, where Janzen teaches four months a year. Over the past two decades he has raised more than $48 million to expand and endow the ACG, a process that involved "crawling on my knees across every carpet in America." At the United Nations, he alluded in a speech to a four-foot stack of his papers and books; he could spend the rest of his life making another stack, he said, cataloging creatures that will all be dead soon, or the world could help him save what is left.

Janzen's specialty is caterpillars, butterflies and moths, but he is also one of the world's leading experts on tropical biodiversity, with a MacArthur "genius" award among his other honors. Last year, Janzen, Hallwachs and three colleagues announced that the common skipper butterfly (*Astraptes fulgerator*) actually comprises at least ten distinct species. That's terrific, on one hand, but on the other, there are now ten species to keep track of. As the first sentence of the paper announcing the find somberly observed: "We are driven to find and describe our planet's unrecognized biodiversity because it is disappearing before our eyes."

The work on *A. fulgerator* helped advance a technique known as "DNA barcoding," Janzen's latest passion. Following the work of Paul D.N. Hebert of the University of Guelph, in Ontario, a pioneer in using genetic signatures as species markers, researchers have identified some 650 base pairs of DNA from the mitochondrial structures in living cells that identify a species almost as reliably as a barcode label identifies a box of cornflakes. Janzen would push the analogy further, into the development of a portable bio-scanner, a device he first encountered in science fiction magazines growing up in the 1950s. "I want something I can stick in my pocket, and pull the leg off a beetle and stick it in, and 30 seconds later, out comes the scientific name, or else a light goes on and it says, this is a new species—and I want to do it for a penny," he says exuberantly.


Janzen (c. 1997) says the key to conservation is "bioliteracy."

Having put the idea into circulation, Janzen is content to sit back and let others carry it forward: he isn't a molecular geneticist, and he has no ambitions to be the Bill Gates of DNA. He views the "barcorder" not just as a useful tool for researchers, but as a way to spread "bioliteracy." "If you don't know what you're looking at, then the tendency is to think of it as just a lot of green trash," he says. "People treat nature the way you would if you were illiterate and saw a library as a big stack of firewood." Naming is the beginning of understanding, which is a step on the way to caring, which is the only thing that will save us all.

Ed Bearss

On any battlefield, he strikes the mystic chords of memory / **BY ADAM GOODHEART**

ED BEARSS has what might best be called a battlefield voice, a kind of booming growl, like an ancient wax-cylinder record amplified to full volume—about the way you'd imagine William Tecumseh Sherman sounding the day he burned Atlanta, with a touch of Teddy Roosevelt charging up San Juan Hill.

We're on a battlefield today, in fact. But now, unlike on a certain summer day 142 years ago, this corner of southern Pennsylvania is quiet, with fields of soybeans and corn drowsing under the midmorning haze. Quiet, that is, except for that voice: "George Armstro-o-ong Custerrr has been a brigadier general for all of five days. He's already got himself the larrrgest starrrs on his shoulders of any general in the Army. He's adopted a red neckerchief with a gold arro-o-ow stickpin in it. And he's just come within a hairrr of losing his life, 13 years before the Sioux Indians send him to the happy hunting grounds."

Several dozen listeners stand silent, transfixed. In Civil War circles, Bearss is nothing short of a rock star. One of the men in the tour group wears a baseball cap covered with commemorative buttons celebrating each of Bearss' birthdays for the past decade (the latest is for his 82nd), while others have been known to wear T-shirts depicting his face on Mount Rushmore or transposed onto Elvis' white jumpsuit with the simple legend: "THE KING."

> He named the cattle on his father's ranch after generals and battles, his favorite cow being "Antietam." –SMITHSONIAN, JULY 1995

What inspires such adulation? As historian and battlefield guide, Bearss' store of knowledge is prodigious. Today, he's spending several hours covering a brief, relatively minor sideshow to the Battle of Gettysburg. He's speaking without notes and admits it's been years since he's read a word about the skirmish on East Cavalry Field. Yet the details pour over us in a heady flow: Rebel cavalrymen on horses exhausted after a 200-mile trek from Virginia. Michigan troopers charging into battle to Custer's cry of "Come on, you Wolverines!" A North-

ADAM GOODHEART, the C.V. Starr Scholar at Washington College in Chestertown, Maryland, writes often on history.

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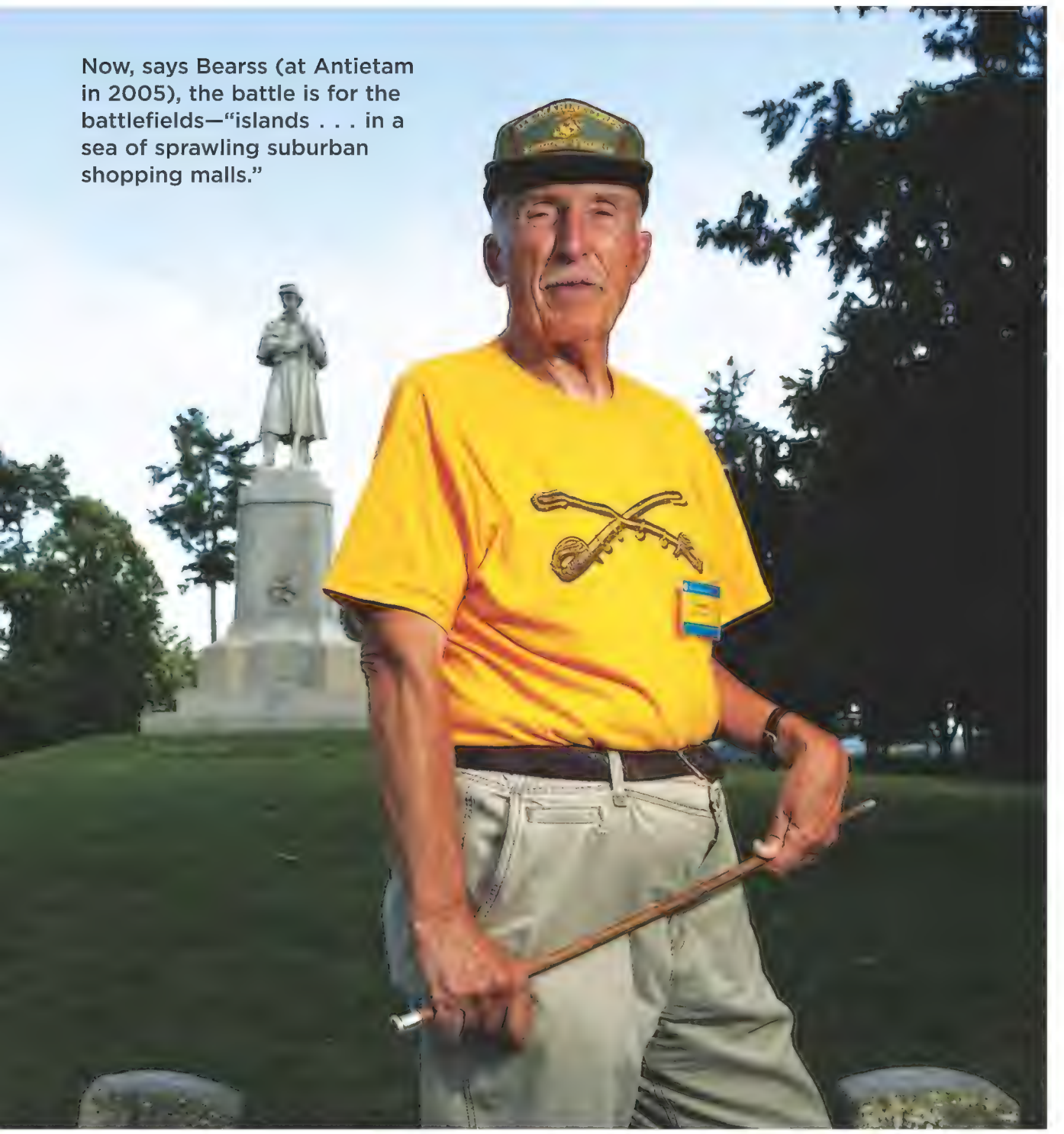

Now, says Bearss (at Antietam in 2005), the battle is for the battlefields—"islands . . . in a sea of sprawling suburban shopping malls."

CAMERON DAVIDSON

ern captain felled when a Confederate color-bearer drives the spear point of his guidon into the Yankee's open mouth.

As he talks, Bearss marches back and forth, brandishing a silver-headed swagger stick, tucking it from time to time under his withered left arm—a casualty of a bullet at a battlefield on the other side of the world in 1944. He keeps his eyes tightly closed while he lectures, and he later tells me that way he can see the events of 1863 unfolding before him.

Some might say that Bearss has spent most of his life in the 19th century. He grew up with kerosene lamps and horse-drawn plows in Montana. He remembers Civil War stories told firsthand by the hometown veteran, "Grandpa" Henderson, who "used to sit around the hotel lobby with his reunion ribbons on."

After serving in the Marines and earning degrees at Georgetown and Indiana universities, Bearss joined the National Park Service (where he is now chief historian emeritus) and devoted himself to the study of the American past, particularly the struggle between the blue and the gray. When he compares contemporary America to the 1860s, his allegiance is clear: "We're in an age of Teflon people now. People then were more original, more individual."

Yet when he has to, Bearss can stand squarely in the present, as he has proved rather often of late, enmeshed in one 21st-century battle after another—over the suburban development that has threatened to engulf Civil War battlefields. Here at Gettysburg, for instance, the idyllic vista before us is broken by a water tower that went up a few years ago, part of a new industrial park. Just to the right of it, investors want to build a casino with 3,000 slot machines.

It's a scenario that, in various permutations, has repeated itself at many sites over the past decade or so. Bearss is well-armed to support the preservationist side of the fight. He remembers visiting Manassas in 1941, when it was a sleepy rural area; now, when he leads bus tours there, they often end up stalled in shopping center traffic. At Petersburg in the early 1960s, he saw where an 1864 fort was bulldozed to make way for a mall; now the mall itself is nearly derelict. "The development is advancing more irresistibly than Grant's army did on Richmond," Bearss grumbles.

"Ed's name carries a lot of weight," says Dean Shultz, a leader in the land-conservation movement at Gettysburg. Some years ago, a preservation group was debating whether to help purchase easements on the ground where Custer gathered his men for the East Cavalry Field assault. There was concern about whether the site was truly historic. "So finally I said I'd talked to Ed Bearss, and he said it had historic significance," he says. "And they said, 'Well, if Ed Bearss says it's worth saving, it's worth saving.'"

Like Custer's men, preservationists now face a do-or-die moment, Bearss says. "The battles are going to be played out in the next 10 to 20 years, because by then the battlefield parks will be islands in urban corridors of the United States, in a sea of sprawling shopping malls."

On East Cavalry Field, our tour draws toward a close beneath a granite column topped by a statue of a Union cavalryman. "The trumpets are playing," Bearss intones. "Thirteen hundred sabers are drawn. They flash in the sun. The Confederates are coming toward them: five regiments, riding boot to spur. Men of Michigan, are you ready? Charrrrrrrge!" And suddenly he's off, his swagger stick flailing—a hunched figure racing across the soybean field, charging fearlessly forward into the past.

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Frank Gehry

The architect's daring, outside-the-box buildings have revitalized urban spaces / **BY ROBERT DUFFY**

When the exuberant, sensuous Guggenheim Museum in Bilbao, Spain, was finished in 1997, its architect ascended like a rocket into international celebrity. Not that Frank Gehry had been unknown. In 1989, he'd won the Pritzker Architecture Prize, an honor that placed him in the company of such luminaries as Philip Johnson, I. M. Pei and Richard Meier. But with the enormous publicity swirling around Bilbao, Gehry achieved a fame rare among architects. This Basque-country branch of the Guggenheim Museum family, although initially controversial, is the crown jewel of that contentious region and is credited with the reinvigoration of the old industrial city of Bilbao and its environs. It was Frank Lloyd Wright who designed the first Solomon R. Guggenheim Museum, completed in Manhattan in 1959. It, too, caused a sensation. Wright, who died that same year, used to be the architect of the moment. Today, it's Gehry.

Frank O. Gehry was born in Toronto, Canada, in 1929. He moved with his family to Los Angeles as a teenager and studied architecture at the University of Southern California. He worked for other architects, studied city planning at Harvard, lived in Paris, and eventually went back to California, where he started his own architectural practice.

The Gehry we know today began to evolve in the 1970s and '80s. He was hanging out then with a group of innovative artists in the beach community of Venice, west of Los Angeles, that included Ronald Davis, Larry Bell and Bruce Nauman. "Those weren't the only artists I knew," Gehry told me recently. "I had some involvement in New York too," but the California group, he explains, "was a family thing. I had a more intimate view of their making of art and it inspired me a lot and influenced the way I made architecture."

> Frank is unique in his passion for using strange shapes and giving you a gut reaction. . . . His buildings are shocking but they give you a mysterious feeling of delight. –SMITHSONIAN, APRIL 1987

One of Gehry's early—1970-72—architectural successes was a collaboration with Ron Davis on Davis' studio and house in Malibu, California. It is constructed of basic building materials—fir, galvanized steel, plywood and concrete, and although reverent toward its setting, it is not designed to "blend in." The impulse to make buildings that nestle inconspicuously into their environments (a rationale given for a lot of dreadful 20th-century design) is the antithesis of Gehry. He designs buildings that stand out—vividly and audaciously. They are ardent in their expressiveness, rich in symbolism, assertive and individual. They can appear to be, and sometimes are, confrontational.

Gehry's own house in Santa Monica is his reinvention of the middle-class house on the middle-class suburban street. To the chagrin of his neighbors, Gehry transformed what was originally a conventional, pink two-story bungalow—a "normal" dwelling—into a work of residential sculpture eccentric by any standard. He used chain-link fence and other humdrum materials on the home's exterior, he explains, because they were so familiar—it was his way of using a visual language common to everyone. But the neighbors, he says, "did not understand that I was taking the chain-link fence from the backyard and using it in a new way."

Gehry resists naming one building as his personal best or his favorite. He doesn't want to single out one child for fear of hurting the others. Clients, he says, "especially sensitive clients, say 'What about *my* project?'"

Once a building is complete, he continues, "I freak about what might have been done differently or better." But he eventually gets over that concern and sees a project more clearly. Most of his buildings have been constructed in places other than Los Angeles, so he's not constantly confronted by past work. His 2003 Walt Disney Concert Hall, however, is an exception. He goes to concerts there regularly. "I've managed to get over the self-critical bullsh-t by focusing on the music and the musicians and experiencing them personally as friends," he says. His relationship with the hall is a rich, continuing experience in which architecture and music intertwine. "That is pretty much what I get excited about," he says.

That and ice hockey. "I have a weird, Walter Mitty-like relationship with hockey," he explains, though he seldom

Missouri-based author ROBERT DUFFY *has been writing about art and architecture for the* St. Louis Post-Dispatch *for 30 years.*

MARK HANAUER / CORBIS OUTLINE

Gehry (at the building he designed for the Chiat/Day advertising agency in Venice, California, in 1991) has created structures that have drawn brickbats as well as critical praise.

gets to play these days because of his hectic schedule. But he sponsors his own semipro team, the FOG.

Gehry's current projects include a science library for Princeton University, a hotel in the north of Spain and a residential and sports facility in England. He's also building a new house for himself in Venice. But this time, he says, "I did it differently." He gave his neighbors—including a convent next door—a heads up about his intentions. "The neighbors saw the model," he says, and "everyone seemed OK." Gehry's work, in fact, has weathered many storms—and not just from critics. His new, $30 million Ohr-O'Keefe Museum of Art—built to showcase the work of the eccentric, turn-of-the-century potter George Ohr—in the Gulf Coast town of Biloxi, Mississippi, was pounded by hurricane Katrina in early September. The five buildings in the complex were in various stages of completion at the time. One was demolished by a dislodged casino barge. Two others, nearly completed, sustained minimal damage. The remaining two were in early stages of construction and not affected, but a number of the stately live oak trees, around which the buildings were designed, were destroyed.

In 1989, former *New York Times* architecture critic Ada Louise Huxtable described Gehry as an "admirer of the quirky, the accidental and the absurd. . . . an obsessive perfectionist engaged in a ceaseless and demanding investigation of ways to unite expressive form and utilitarian function." Gehry has also been described as an outsider, an outlaw. Most men and women who operate on the edge or beyond are dismissed, shunned, laughed at or locked up. But sometimes they triumph, as Gehry has. And when that happens, their influence is palpable and the world expands before our very eyes.

Gehry (with project models in his Santa Monica office in 2000) forged a startlingly new architectural vocabulary.

Janis Carter

The primate who taught other primates how to survive in the wild / **BY DOUGLAS FOSTER**

EVERY GREAT CAUSE has its galvanic moment, when the world finally takes notice. Then comes the hard part—sustaining the commitment long enough to make a real difference. The campaign on behalf of the great apes enjoyed this kind of collective epiphany in the early 1970s after researchers discovered, among other things, that chimpanzees fashion crude tools, demolishing a supposedly essential difference between ourselves and our closest genetic kin. Around then, a wave of researchers, many of them women, set off in search of primates to study. Most have long since returned home. Among the exceptions is Janis Carter, who arrived in West Africa in 1977 for what she expected to be a three-week stay. She has been there ever since.

When I reached her by telephone in Banjul, Gambia, she seemed perplexed to be reminded that she has been working with chimpanzees in Africa for nearly 30 years. "I'm 54," she said as if passing on an unlikely news flash. "I still consider myself young even though I don't climb trees anymore, and I'm trying to be more careful."

Carter was on her way to visit the sanctuary for orphaned and captive-born chimpanzees that she helped establish on three islands in the Gambia River. Then she planned a return to the forests of Guinea, where she has been working with hunters, villagers and government officials to protect habitat for endangered wild chimpanzees. "I do have an odd sort of lifestyle," she conceded.

Blame it on serendipity. Carter was a graduate student in psychology at the University of Oklahoma when she accompanied two chimpanzees being released in the wild in Gambia, a coastal West African country. One was Lucy, a captive-born chimpanzee famous for being able to communicate in sign language. Carter was supposed to stick around just long enough to smooth the chimps' transition, but the venture proved far more difficult than she'd expected. After all, Lucy had been raised in a human home and perhaps thought of herself as a human child. In some senses, Lucy and other chimpanzees arriving on the island had to be instructed in how to become more fully themselves.

Carter demonstrated which foods were safe, led for-

DOUGLAS FOSTER, of the Medill School of Journalism at Northwestern University, writes about politics and science.

DENNIS STOCK / MAGNUM PHOTOS

The best hope, says Carter (with Esme in Gambia in 2002), is to forge a "relationship between people and chimps living close to them."

JANIS CARTER COLLECTION

aging expeditions, and communicated through chimp vocalizations. In one of two stories she wrote about her experiences for SMITHSONIAN in the 1980s, she stated: "I knew that if the chimps' return to the wild was to be successful, I too would have to limit my contact with humans." The chimps were let loose on the island. She slept in a cage.

In 1985, Dash, a young male chimpanzee, attacked Carter, dragging her a considerable distance. Her body got caught in a thorn bush, and she escaped by rolling into the water for a swim back to her cage. As she nursed her wounds, it dawned on Carter that she'd just been knocked off her perch as the dominant leader on the island and would have to move.

> I would climb a low branch, tear off young leaves and eat them voraciously, while emitting satisfied food grunts.
>
> —JANIS CARTER, SMITHSONIAN, APRIL 1981

Shortly after Carter left the island, Lucy died, possibly killed by a poacher. Devastated, Carter considered leaving Africa. But while puzzling over Lucy's death, Carter realized, with a start, how little she knew about the people who occupy dozens of villages along the Gambia River near the refuge. She saw that their support was essential to ensure the chimps' safety. "What Lucy's death did was push me toward human beings and away from the island."

When she reached out to the villagers, she discovered how little they understood her. One told her about a dragon-like creature that villagers believe lives on the island and about villagers' suspicions that she was in cahoots with it.

Carter began surveying the attitudes of villagers toward chimpanzees and monitoring chimpanzee populations in neighboring Senegal and Guinea. In the Nialama Classified Forest in Guinea, she tapped local hunters' knowledge about where chimps find water and food, marked the corridors that link their feeding areas and mapped their migration patterns. This knowledge helps government officials and community leaders direct farming and logging where they won't interfere with chimp survival.

Toward the end of our conversation, she mentioned Dash. She'd taught him how to recognize crocodiles and gather food before he drove her from the island. Thirty years old, he remains the swaggering, dominant male in his group, one of four groups in a population of more than 60 chimpanzees. Now, though, he's down to his last tooth. Like the mother of an aging son, Carter seemed startled to have discovered that Dash has grown pudgy. "It just seems unnatural that I'm going to outlive him," she said. "Unnatural somehow."

Robert Moses

A former civil rights activist revolutionizes the teaching of mathematics / **BY NEIL HENRY**

ROBERT MOSES finally finds a moment to return a reporter's phone call on a hectic afternoon. He's standing outside a rural grocery store near Beaufort, South Carolina, getting ready to deliver a speech about equal opportunities for disadvantaged American kids. "It's all about organizing. It's always been that way," Moses, a recipient of a 1982 MacArthur "genius" award, says in a measured tone as he waits for his wife, Janet, to pick up a few supplies in the store. "And making sure that people's demands are consistently heard, whether it's the right to vote in the old days or the right to a quality education today."

Moses is 70 now, but his voice sounds as impassioned as ever. The Harlem-raised, Harvard-trained math educator first traveled to the South 44 years ago. As a field director of the Student Nonviolent Coordinating Committee, he risked his life several times to help register blacks to vote.

In 1964, Moses also helped plan what came to be known as Freedom Summer, when activists who included white Northerners and university students went to Mississippi to register rural black voters.

Milestone reforms that that effort sparked, such as the Voting Rights Act of 1965, allowed black Americans to enjoy rights that were promised under the Constitution. But entrenched poverty and other inequities have continued to occupy Moses. Although his field of operations has certainly changed, in some ways he has never left "the movement" at all.

When writer Bruce Watson visited him nearly a decade ago for SMITHSONIAN, Moses was immersed in something he called the Algebra Project, an innovative initiative to teach math literacy to poor and minority students at the middle- and high-school levels in the rural South and the nation's inner cities. Seeking to redress the failures of many public schools, the project aimed to prepare students for college and future employment in a society where, Moses believes, proficiency in science and math are key to "successful citizenship." He has used everything from gumdrops to music and rides on the subway to make mathematics more fun and more accessible. By 1996, the project had reached some 45,000 pupils, and its instructional materials were being used by teachers in 105 schools across the country.

> "Math literacy and economic access are how we are going to give hope to the young generation."
>
> –ROBERT MOSES, SMITHSONIAN, FEBRUARY 1996

But over the past decade, Moses says, the nation's educational priorities have shifted to emphasize test results and teacher accountability, leaving approaches such as the Algebra Project strapped for funds. Its 2005 operating budget of roughly $1 million—from federal and private sources—is only about a quarter of what it was in 2000.

Today, Moses teaches classes in trigonometry and introductory engineering to 43 students at Lanier High School in Jackson, Mississippi. He wants his charges to enter college on an equal footing with their more advantaged peers.

"I do still think of it the same way I felt about the voting rights struggle," he says. "Back then, the common belief was that black sharecroppers weren't smart enough to vote and didn't care about voting. But that mind-set certainly changed when thousands of sharecroppers began to appear at the polls. Their demands helped force change. I think a similar strategy will succeed in education."

These days, he says, "it's the grandchildren and great-grandchildren of the people who were gridlocked in previous generations who are key" to stemming the crisis in school dropout rates. Moses is also campaigning to pass an amendment to the U.S. Constitution, guaranteeing every child in America the opportunity to receive a quality public education. "We had our first meeting in March at Howard University and expected maybe 30 people to show up. But we actually got more than 130," he says of the Quality Public School Education as a Civil Right campaign.

Does he feel demoralized by the slow pace of change?

"No," he answers. "I think there still operates a belief at a deep level in this country in the idea that if kids can do it, they should be given an opportunity to do it. That belief keeps one optimistic. So I don't become too distracted by the pace. You can live a good life in this country, but struggle is also a necessary part of it. That's how I see my life."

NEIL HENRY, a journalism professor at UC Berkeley, is completing a book, American Carnival: Surviving the News in an Age of Fraud.

ELI REED / MAGNUM PHOTOS

Moses (at his Lanier High School office in Jackson, Mississippi in 2002) believes that proficiency in science and math are essential to achieving "successful citizenship."

Maya Lin

The architect melds surface simplicity and underlying intellectual complexity into works of enduring power / **BY MICHAEL PARFIT**

"People ask, 'If you'd never won the Vietnam Memorial award, where would you be?'" says Lin (in her New York City studio in 2002). "I reply that I'd be making things, same as I am now."

NEAR THE WIND- and water-swept expanse of a park on the coast of Washington State, energy born in distant storms rises out of the seas to break against the bar of one of the great rivers of North America, the Columbia. In the park there's a terrific view of a bay north of the breakers, and in the middle of the view there's a sink.

"It's hysterical," says the artist and architect Maya Lin. "It's this double stainless-steel sink, and it's just sitting out there in one of the most beautiful vistas. But it's not so beautiful, because it's this beat-up thing."

The beat-up thing is actually used for cutting fish. It's where you go if you've just caught a salmon and you need to clean it to take it home. It's a working sink, with piped-in water: blood, guts, a bit of slime, and you're done.

But for Maya Lin, who may never be able to shed her introductory credit—"She designed the Vietnam Memorial"—this sink is a window that her art can open. The fact that the trajectory of Lin's creative life allows her to focus on a beat-up sink with the same thought and energy she brought to memorializing American soldiers killed in Vietnam makes the direction she has chosen in life clear. It's not an easy path, but it's a good one.

Her work so far includes some striking additional memorials, including the Civil Rights Memorial in Montgomery, Alabama, and a memorial to the women of Yale, where, as a 21-year-old architecture student in 1981, she designed the Vietnam Memorial as a class exercise. Her work also includes several public and private buildings, furniture, individual sculptures in stone and other media, earthworks, and sculptures of the shapes of the land in media such as wood and broken glass.

The acclaim Lin received for the Vietnam Memorial, still one of the most emotionally powerful monuments in the world, gave her extraordinary freedom right at the start of her working years. She held the ticket to prolonged fame in her hand. She could have made a career as a designer of monuments, a specialist in the honoring of people, places, things. She could have become a person of grandeur, building great monuments for only the greatest of events. Princes would have begged her for an audience; warriors would have wondered if their battles were worthy of being noticed by Maya Lin; the president would have invited her to the ranch.

> "I'm asking for a one-on-one relationship between the viewer and the work. . . . In the end, it breaks down to an intimate, psychological experience."
>
> —MAYA LIN, SMITHSONIAN, NOVEMBER 2002

But that was not the choice she made. She spurned the golden ticket and, symbolically speaking, went looking for the sink. "People ask, 'If you'd never won the Viet-

Writer and documentary filmmaker MICHAEL PARFIT has written some 30 articles for this magazine. He's currently coauthoring a book about Luna the whale (SMITHSONIAN, November 2004).

nam Memorial award, where would you be?'" she says. "I reply that I'd be making things, same as I am now."

Individuals who are driven by that kind of creative desire seem to have no option but to follow it. To them, all of those other lovely flames of fame, fortune, glamour, money, power or influence seem hardly to burn. They are drawn to the greater pyre. "I think we don't have a choice," Lin says. "It's exploration." Her book about her work, *Boundaries*, says virtually nothing about the personal impact of her early prominence; in it she seeks to understand how her process of making things operates.

"I think with my hands," she says in the book. She also notes, "I do not think you can find a reason for everything you make." The sections of the book that touch on her personal life focus almost entirely on how experience has informed her work.

In one way Lin's early success gave her the authority to take the risks that a creative life requires, but in another way it made the risks greater by raising expectations. This does not appear to worry her; her response to the success seems to be to worry not about acclaim but about the demands of the critics inside her own head. Her concern is not that she won't get the acclaim again but that her creative voice might be fragmented by the breadth of her explorations in both art and architecture.

"I was trying to come to some understanding of mourning and grieving," recalls Lin (in 1981, at age 21, with her design for the Vietnam Memorial).

BETTMANN / CORBIS; PP. 100, 101 ENRICO FERORELLI

"OK," she says, "so your great fear was you're going to be very scattered. But I think at this point in my work the voice is consistent. And that's all you want."

As with many artists driven by wide-ranging passion, her unique view may be difficult to grasp whole until her life's work is seen in its entirety.

Many of her projects have a surface simplicity, shaped by an underlying intellectual and emotional complexity. These forces often emerge through a few words carved in stone. Context combines with content to hit you in a way you did not see coming.

At one site of her current Confluence Project—a series of artworks that honor the explorations of Lewis and Clark—a timeline will describe their journey. But the text that accompanies it will not say: "Then the great explorers passed through the wilds of what is now Idaho." Instead, there will be a list of the names of the Native American tribes who lived in the places the explorers passed: Nez Percé, Chinook, Shoshone, Sioux, Cheyenne, Mandan and others. The list gathers quietly in the mind, then suddenly rises up and breaks over you, like the waves of the Columbia, with a forgotten truth: this land was not unexplored. It was *their* land.

"It's subtle," says Lin. "You know I hate to preach. But we can give insight."

And that's how the sink—also a part of the Confluence Project—works.

Lin does a lot of research for the foundations of her work and enlists experts to make sure she gets it right. "The last thing I would want to do," she explains, "is something that, from an academic or historic point of view, is not just inaccurate but wrongheaded." Research, however, gets her only so far. Once she is sure she has the background right, she quits gathering.

"At a certain point I sort of stop looking for research," she says. "I just shut it all down, and then this other stuff comes out."

In the case of the sink, it was this: when she thought about the beat-up piece of stainless steel, Lin remembered something about the Chinook tribe that lived in the area. The tribe's creation story was about how a fish or a whale was cut wrong, and the badly cut fish turned into a thunderbird and laid eggs that became Indians.

So Lin will replace the old sink with a chunk of columnar basalt that will have a sink carved into it and an inscription of the creation myth engraved on its surface. This new sink will still be used by fishermen; it will still run with blood and slime.

In describing it, Lin sees it from an individual's point of view—that of a fisherman. "You're not coming here to see what I've done," she says. "You're coming here because you've always come here. You're coming here because you've just caught a king salmon that's two and a half feet long and you're going to cut your fish here. And then, maybe, you're going to start reading this and you're going to say, 'What is going on here?' And maybe you'll get a hint that this was the sacred grounds of the Chinook tribe."

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Douglas Owsley

Dead people tell no tales—but their bones do, when he examines them / **BY AARON ELKINS**

FOR A MAN who has toiled amid some of the most horrific circumstances imaginable, Douglas Owsley remains remarkably enthusiastic about his work. "I love the moments when you come up with something that you're just totally in awe of," he says. "Something that gives you an overwhelming sense of"—his mobile hands grope for the right word—"a sense of *wow*!"

He is talking about forensic anthropology: bones, human bones. We're having a late breakfast at a café in Seattle overlooking Puget Sound, and Owsley's salade Norvégienne lies untouched as he speaks. "Finding a tiny piece of bone, and then another tiny piece of bone, and putting them together to make a piece no bigger than that"—he spaces his thumb and forefinger inches apart—"and from just that tiny piece, you're able to make an ID of the person it came from. I love that feeling."

> He holds up a femur. . . . "Look at how strong he was—you can see where the hamstrings were attached. . . . You can just imagine him throwing his wife out the window." –SMITHSONIAN, MAY 1996

Owsley, bespectacled and boyish at 54, has had that feeling a lot. He is the division head for physical anthropology at the Smithsonian's National Museum of Natural History, and studying bones is what he does. From skeletal remains he's identified Confederate sailors. He's helped identify war victims in Croatia and U.S. servicemen from the Persian Gulf War. He has exhumed and identified the remains of kidnapped American journalists in Guatemala and identified mutilated homicide victims. By his count he has examined more than 10,000 skeletons, including those of Easter Islanders, Plains Indians and Jamestown Colonists.

It wasn't the career he'd imagined for himself as a pre-med student at the University of Wyoming in the early 1970s. But it was there that he ran into an enthusiastic young anthropology professor named George Gill, who took him along on an archaeological dig in Mexico. The thrill of seeing ancient Aztec remains emerging from the ground convinced Owsley that he'd chosen the wrong field; he switched majors and placed himself under Gill's tutelage. "Doug was naive and wide-eyed," Gill recalls. "He didn't even know where Kansas was, and it was two states over. But he was tremendously intelligent and inquisitive."

Now Owsley not only knows where Kansas is, he knows as much about human bones as anyone alive. He was in Seattle recently to examine some of the more fascinating and controversial remains of our time: those of Kennewick Man, at more than 9,000 years old one of the earliest skeletons ever found in the Americas.

Discovered along the Columbia River in eastern Washington in 1996, Kennewick Man became the focus of a long and contentious legal battle. Anthropologists quickly judged

Outside his lab, Owsley (in 1999) is surrounded by drawers housing about 30,000 partial or complete human skeletons.

KATHERINE LAMBERT

AARON ELKINS is the author of 20 crime novels, including a dozen featuring the forensic anthropologist Gideon Oliver.

that the figure's skeletal features bore little similarity to those of modern Native Americans. Nonetheless, several Northwest tribes claimed him as an ancestor. Under the Native American Graves Protection and Repatriation Act, they sought the right to rebury him immediately, without permitting scientific study of what they called "the Ancient One." The U.S. Army Corps of Engineers, which manages the land where the remains were found, moved quickly to comply, but a group of eight prominent scientists, including Owsley, sued for the right to study the skeleton.

In 2002, a federal court in Oregon ruled that the tribes had failed to establish the requisite links between themselves and the remains, meaning that the skeleton could indeed be studied; a panel of the U.S. Court of Appeals for the Ninth Circuit upheld the decision two years later. For Owsley and his colleagues, it was a victory not over Native American interests but for science and the study of America's early heritage—a precedent to ensure that ancient remains discovered in the future can also be studied, in much the way that the Iceman of Tirol (4,000 years "younger" than Kennewick Man) has been, yielding data to scores of scientific disciplines.

Kennewick Man is now housed at the Burke Museum at the University of Washington. Owsley is leading a team of 11 researchers in various fields—among them archaeology, anthropology and geochemistry—who are beginning to tease out knowledge about this very early American and his times. Owsley's lively, happy conversation over breakfast is all about soil sediments, silt deposits, bone-fracture lines and stone projectile points (one of which was found embedded in Kennewick Man's hip).

When the conversation shifts to other aspects of his work, his manner becomes markedly less animated. Owsley was called in after both the Branch Davidian disaster in Waco, Texas, in 1993, in which at least 82 people perished, and the 9/11 attack on the Pentagon, in which 125 died. His job was to piece together the identities of the dead, not from dry, clean bone fragments, but from the human detritus of fire, explosion and unimaginable force.

"I have an ability to numb things out," he says, pushing at a chunk of crab and staring out the window as a big white-and-green Washington State ferry slides prettily into view. He doesn't seem to see it. "You have a job to do," he says evenly. "You approach it objectively. But when you look at these smiling pictures of the people you're trying to identify, and then you look at the things you have in front of you. . . . " He shakes his head.

Appetite and animation both reappear when the subject turns to what seems to be his second-greatest enthusiasm after bones: the 30-acre farm in Virginia on which he lives with his wife, Susie. "We have tomatoes, and corn, and sweet potatoes, and cowpeas in our garden," he says, "and four kinds of raspberries, and blackberries, and marionberries. We've gotten a *great* crop of boysenberries this year!"

He sighs, apparently thinking about the berries. "I love digging," he says without a trace of irony. "I'm a great digger."

Chuck Close

The artist's oversize canvases reshaped the idea of the portrait / **BY ARTHUR C. DANTO**

WHEN CHUCK CLOSE first moved to New York City in the mid-1960s, he found himself part of an artistic community made up largely of his fellow graduate students from Yale, then, like himself, bent on making careers as artists. At Yale, they had all been what he called "junior Abstract Expressionists." Understanding that this was no longer a path to success, they felt under pressure to invent a signature style, a way of making art so entirely original that it might at first not be seen as art at all. That had happened with Jackson Pollock, with Frank Stella and with Andy Warhol, whose work was first looked upon, Close says, "almost as if it were an alien species or something—not art." Ultimately, he says, the art world "reaches out, envelops this foreign body, digests it, incorporates it into its own living matter and tugs it more closely to the mainstream, tames it, makes it more acceptable in some way." The Yalies were in search of "a particular corner that no one else occupied." To be a successful artist meant not just making good work, but reshaping the concept of art.

> Enlarged pores, individual hairs . . . become the topographical irregularities of facescapes. . . . —SMITHSONIAN, OCTOBER 1981

Close really did achieve something entirely and unmistakably his own when he began painting the monumental portraits that are now everywhere perceived as part of the modern canon. Banner-size portraits often imply the subject's importance, like the huge pictures of Mao or Stalin or the Ayatollah Khomeini hanging above crowds of their followers at public gatherings. Miniatures, by contrast, often imply importance of a more intimate kind. One can argue that Close has combined both kinds of importance, giving monumentality to those who happen to mean most to him as individuals, since he mainly paints his family and friends.

Like many breakthroughs in the history of art, Close's portraits came about almost by accident. In 1967, he painted a very large nude, more than 20 feet long, based on a photograph of a model. Photographs are unforgiv-

ARTHUR C. DANTO is the art critic for the Nation *and the author of* Unnatural Wonders *(Farrar Straus & Giroux, 2005).*

WALKER ART CENTER

Close established a signature style and redefined the concept of portraiture with his monumental *Big Self-Portrait* of 1967-68.

ing—the model's skin, for example, was lighter where she had worn a bathing suit—and Close rendered her with all her imperfections. Naked bodies can be exciting, but the big nude was big without being artistically exciting. Something more was needed. On impulse, Close decided to take a picture of himself from the neck up. He leaned back against the wall, lit a cigarette, looked out a bit aggressively and snapped the shutter; his hair was disheveled, his face was covered with stubble, he wore glasses, the smoke curled up. Then he decided to turn the close-up of himself into an oversize painting on a similar scale as the not entirely satisfactory nude. The face, as the French philosopher Gilles Deleuze once said, is the least bodily part of the body. When one looked at the nude, one saw its bodyliness made bland by overexpansion. When one looked at Close's self-portrait, one saw the individuality of his face intensified by immensification, not unlike a horror movie when something is enlarged vastly beyond its normal size. There is something powerful and even dangerous in a perfectly normal, if somewhat shaggy, set of features projected onto a gigantic scale.

The procedure through which Close turned his photograph into a painting belongs to traditional studio practice. A grid was drawn over it, the way the old masters drew grids over studies. Close reproduced each cell in a corresponding but much larger cell on a squared-off canvas. He then worked with thinned-down black acrylic paint, shooting tiny puffs of it through a needle-nosed spray gun to create the overall smooth, almost glossy look of a photographic surface on his nine-foot-tall canvas. It was an exceedingly laborious effort, requiring months of work.

In *Big Self-Portrait,* Close had found his own particular unoccupied corner from which to conquer the world. I recall seeing it and what I took to be its pendant—a painting titled *Phil*—for the first time. I was puzzled as to what they were—they looked somehow too photographic to be paintings and too painterly to be photographs—but they were powerful and unforgettable. The faces, with their inward gazes, parted lips and strong teeth, seemed almost otherworldly—like souls captured on canvas. They looked like nothing else in art.

"If you think about the late 1960s," Close said in a recent interview, "painting was dead, sculpture ruled, painting seemed like a senseless activity. If you were dumb enough to make a painting, it had better be abstract. It was even dumber to make a representational image. Then the dumbest, most moribund, out-of-date and shopworn of all possible things you could do was make a portrait. I remember that [art critic] Clement Greenberg said to de Kooning that the only thing you can't do in art anymore is make a portrait. I thought, well, if Greenberg thinks he can't do it, then I'm going to have a lot of operating room all to myself."

In fact, Close's monster canvases helped change the art world. He, meanwhile, had another agenda. "I wanted to paint Everyman and Everywoman, just regular folks," he says. The titles of his paintings were just the first names of his subjects—Phil, Robert, Richard, Cindy, Linda, Alex. Ironically, many of his subjects—Philip Glass, Richard Serra, Cindy Sherman, Alex Katz—"went ahead and got famous on me." So did he. Other than Andy Warhol, Picasso and one or two others, Close is one of the few artists whose face is recognized by those outside the art world.

Close, now 65, likes to describe himself as "a poor white-trash kid from a mill-town in Washington State"—with dyslexia. The disorder created difficulties in school, but he used his artistic gifts to compensate—he recalls making a ten-foot-long map of the Lewis and Clark expedition for extra credit, which suggests that gigantism came naturally to him. His intense artistic drive also helped him overcome his almost total paralysis, at age 48, from a spinal blood clot. Painting at first with a brush held in his teeth, he invented ways to continue to make his huge portraits, transforming his impediments into an entirely new style, as unmistakable as the one that first gave him fame. The subsequent portraits no longer look like photographs, but they could be nothing other than Closes.

Close (at work on *Self-Portrait, 2004-05*) has regained the use of his hands after a blood clot left him paralyzed in 1988.

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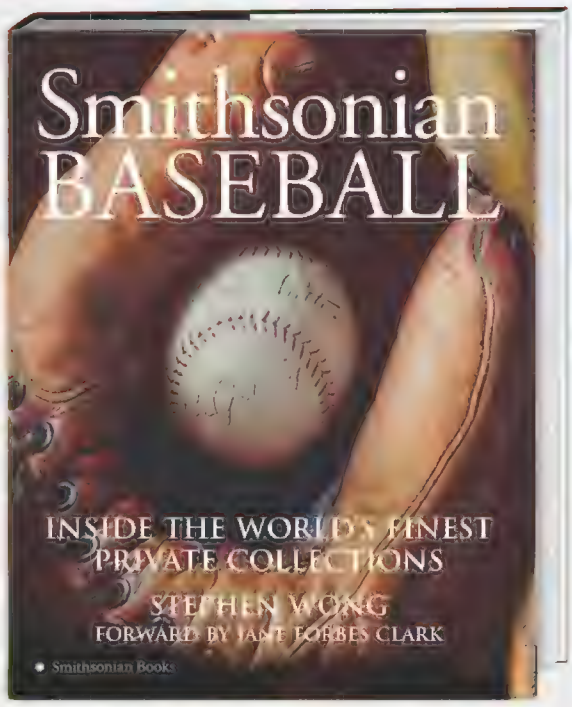

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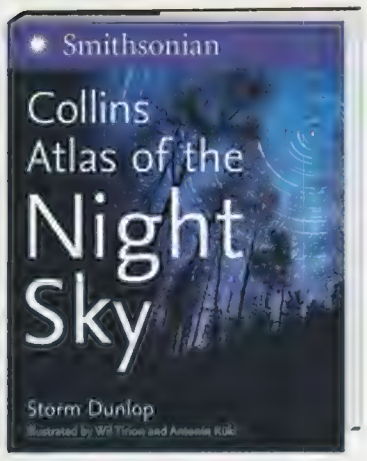

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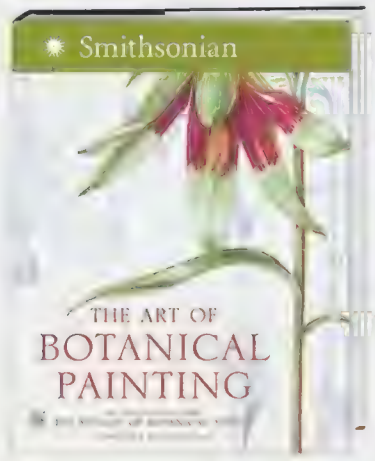

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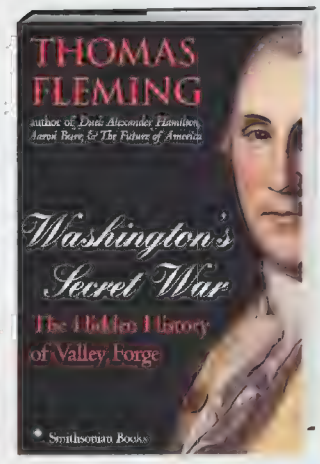

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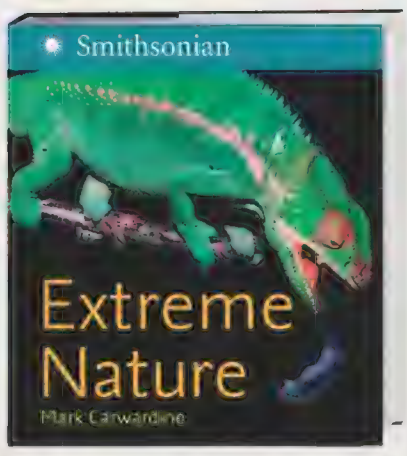

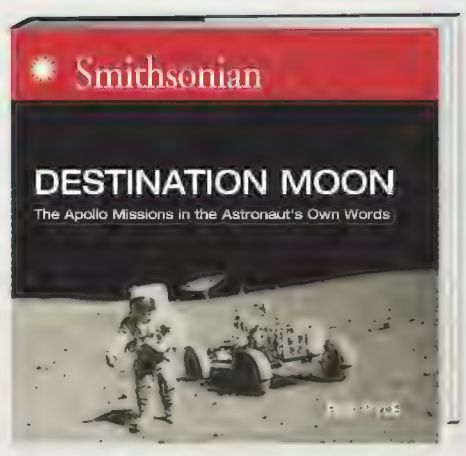

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Steven Spielberg

A renowned director contemplates the lessons of history / **BY KENNETH TURAN**

BEFORE *Saving Private Ryan* and *Schindler's List*, before the trio of Oscars, director Steven Spielberg's most impressive work was not an entire film—not *Jaws* or even *E.T.*—but the opening 40 minutes of a little-remembered 1987 effort, *Empire of the Sun*.

Taken from an autobiographical novel by J. G. Ballard about his experiences during World War II, *Empire*'s memorable introductory segment, which evokes events surrounding the Japanese invasion of Shanghai, displays Spielberg's singular gift—unexpected for someone who has often said "I dream for a living"—for bringing history to vivid life.

This gift, and the director's determination to use it in the service of persuasion—to bring history alive in order to spread its lessons—turned out to be the making of Spielberg. That gift saved him from becoming a servant of the marketplace. It made him a filmmaker of stature, someone who today puts serious observations about the fate of humanity into even commercial ventures such as *War of the Worlds*.

His paradoxical willingness to use detachment and reserve almost to the point of withdrawal in order to get the most emotional power out of historical re-creation was first evident throughout an entire movie in the Holocaust-themed *Schindler's List*, which examined a subject that Spielberg, with personal and emotional ties to the world of Eastern European Jewry, clearly hungered to do justice to. He also established the Righteous Persons Foundation to give away, in grants, his portion of profits from the film.

"While making [*Amistad*], I felt I was telling everyone's story—a story that people of all nationalities and races should know."
–STEVEN SPIELBERG, SMITHSONIAN, DECEMBER 1997

The touchstone of *Schindler's List* is the way it depicts the incomprehensible brutality that took place under the Nazi heel. Working extensively with a hand-held camera and functioning almost as a documentarian, Spielberg, understanding how important it was to show the casualness of the nightmare, had the nerve to simply let those dreadful scenes play out without special emphasis. As a consequence, he created as indelible and realistic a picture of the Holocaust as fiction allows.

If *Amistad*, the story of the momentous aftermath of an 1839 shipboard rebellion of 53 African slaves off Cuba, was not as commercially successful as *Schindler's List*, its visual evocation of the past was equally impressive. Many of the film's most lasting moments, like a ravaged slaver passing an elegant party listening to shipboard chamber music, re-create reality so beautifully without dialogue that they recall the wordless triumphs of the great silent films. *Amistad*'s strongest scene, a depiction of the torments of the middle passage—the journey newly sold slaves made from Africa to the Americas—also plays without dialogue.

Similarly, for the epochal D-Day invasion scenes that open *Saving Private Ryan,* Spielberg's respect for material compels both a brutal honesty and the greatest restraint. The son of a World War II combat veteran, Spielberg was determined to trivialize neither the nature of war nor what it does to participants. As a result, *Private Ryan*—as much an experience we live through as a film we watch—is a darker and more pessimistic look at battle than we are used to. Spielberg got so close to the chaos of warfare that the film led veterans who had never spoken to their children about combat to do so.

The slaughter starts immediately. Men are enveloped in flames, shredded by bullets, dead as they set foot on the beach, or they succumb in slow motion, dragged underwater.

"I didn't think this would be tolerable to audiences; I thought this was going to be inaccessible," Spielberg admitted when I interviewed him for the *Los Angeles Times* shortly after the film's release. (In person, the director, who is now 58, projects a calm assurance that may stem from having been a public figure for more than half of his life—not to mention being the father of seven children.) "I said to my cast midway through shooting, 'Don't think of this as something we're going to go out and make a killing on, but just as a memorial. We're thanking all those guys, your grandparents and my dad, who fought in World War II.'"

Spielberg understands that when handled correctly, nothing brings history's lessons alive as indelibly as film. If anyone takes to heart George Santayana's dictum that "those who cannot remember the past are condemned to repeat it," it is this Hollywood director turned historian.

KENNETH TURAN, film critic for the Los Angeles Times, *is the author of* Never Coming to a Theater Near You.

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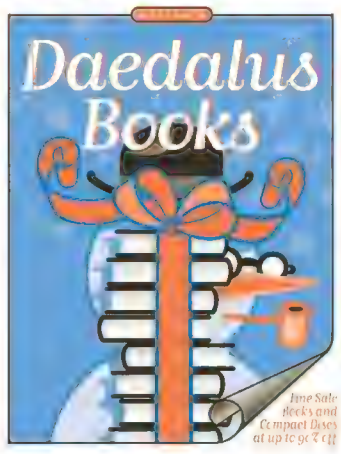

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AS HURRICANE KATRINA MADE CLEAR, THE LESSONS OF THE MISSISSIPPI FLOOD OF 1927 (WHICH MADE HERBERT HOOVER PRESIDENT) HAVE YET TO BE LEARNED **BY JOHN M. BARRY**

The response to the flood (Greenville, Mississippi, in April 1927) was the most costly U.S. undertaking since World War I.

In the latter part of August 1926, the sky darkened over much of the central United States and a heavy rain began to fall. Rain pelted first Nebraska, South Dakota, Kansas and Oklahoma, then edged eastward into Iowa and Missouri, then Illinois, Indiana, Kentucky and Ohio. The great storm lasted for days. It was followed by another low-pressure system heavy with moisture moving up the Mississippi Valley and pouring precipitation over this same region. And then another.

On September 1, water poured over the banks of dozens of streams and flooded towns from Carroll, Iowa, to Peoria, Illinois, 350 miles apart. On September 4, floods deluged much of Nebraska, Kansas, Iowa, Illinois and Indiana, killing four people. The Mississippi River rose rapidly in the upper Midwest and washed out bridges and railroads. A few days later another storm brought flooding to towns from Terre Haute, Indiana, to Jacksonville, Illinois. Seven people died. More rains fell. On September 13, the Neosho River rose to record heights and roared through southeastern Kansas, killing five. In Iowa, 15 inches of rain fell in three days.

Through September and October, floods in Nebraska, South Dakota, Oklahoma and elsewhere were the greatest ever. At Vicksburg, Mississippi, the river gauge had never exceeded 31 feet in October. That month, it topped 40 feet.

The Mississippi River is not simply a stream that begins in Minnesota and runs south to the Gulf of Mexico. Its fingers stretch from near New York and North Carolina in the east to Idaho and New Mexico in the west. All fall, the rains continued over almost this entire basin. On December 13, in South Dakota the temperature fell 66 degrees in 18 hours, followed by an intense snowstorm. Helena, Montana, received 29.42 inches of snow. In one day, 5.8 inches of rain fell on Little Rock, Arkansas. The Cumberland River rose to the highest level ever recorded and flooded Nashville. The Tennessee River flooded Chattanooga, killing at least 16 and making thousands homeless over Christmas. On New Year's Day, the Mississippi itself went above flood stage at Cairo, Illinois, and would stay above flood stage for 153 consecutive days. In January, Pittsburgh flooded, Cincinnati flooded, Louisville flooded. To the west, outside Oklahoma City, 14 Mexican migratory workers drowned.

All spring the rains continued, punctuated by five sepa-

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"This isn't a natural disaster," Gifford Pinchot said. "It's a man-made disaster."

The Red Cross (a Forrest City, Arkansas, camp) fed roughly 650,000 for months.

rate storms, each greater than any storm in the preceding ten years. The largest came on Good Friday. From 6 to 15 inches of rain poured down over an area in excess of 100,000 square miles, north into Missouri and Illinois, west into Texas, east almost to Alabama, south to the Gulf. New Orleans received the greatest rainfall ever recorded there; in 18 hours, 14.96 inches fell. Still, New Orleans did not flood, chiefly because the river had broken levees hundreds of miles upstream, so the flood crest never reached the city.

It would become, until Katrina, the nation's greatest disaster. But the story of the 1927 flood, like that of Hurricanes Katrina and Rita, is not simply a story of nature's force. As Gifford Pinchot, then governor of Pennsylvania and a pioneer environmentalist, said after surveying the 1927 destruction, "This isn't a natural disaster. It's a man-made disaster."

Since before the Civil War, the U.S. Army Corps of Engineers had regulated the Mississippi River, and since the 1880s had insisted upon a "levees-only policy"—that is, a belief that levees alone were all that was needed to control flooding. The corps believed that if the quantity of water in a river increases, the current will accelerate. This is generally true. The theory also assumed that a faster current would scour the riverbed more than a slower current, and thus deepen the river. This is also true. But the corps further concluded that such scouring would deepen the river enough to accommodate even a huge flood. This was not true. In fact, all the scientific data about the river up to that time—most of it collected by the corps itself—contradicted that assumption. Nonetheless, the corps opposed building spillways and floodways to let water out of the river, and it had closed off natural reservoirs to maximize the amount of water in the river.

Then, in 1927, the disaster that critics of the corps had long expected finally arrived.

When it was over, the Mississippi River and its tributaries had killed people from Virginia to Oklahoma, flood-

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JOHN M. BARRY, of the Tulane-Xavier Center for Bioenvironmental Research in New Orleans, is the author of Rising Tide, *about the Mississippi flood of 1927.*

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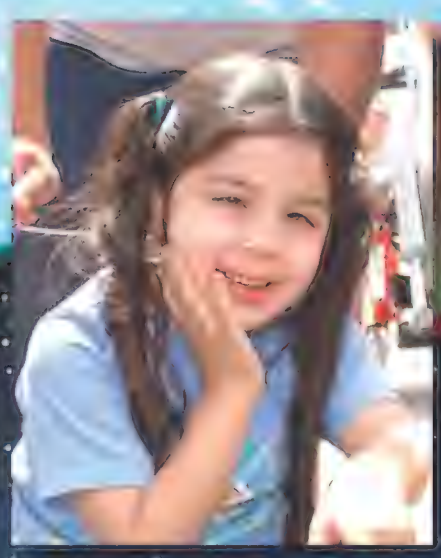

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ing the homes of approximately 1 percent of the U.S. population. At its widest point, north of Vicksburg, Mississippi, the river became an inland sea nearly 100 miles across. No one knows the death toll; officially, the government said 500 people died, but a disaster expert who visited the flooded area estimated that more than 1,000 perished in the state of Mississippi alone. The Red Cross fed roughly 650,000 for months, many for a year; 325,000 lived in tents for months, some of them sharing an eight-foot-wide crown of a levee—the only dry ground for miles, with flooded land on one side and the river on the other, their hogs, mules and horses in tow but not their dogs, which were shot for fear of rabies. The worst of the flooding occurred in April and May. Not until September did the floodwaters drain from the land.

The devastation left a legacy of change far beyond the flooded regions—changes that are still being felt today. The first involved the river itself. The 1927 flood ended the debate over the levees-only policy and forced engineers all over the world to look at rivers differently. Most recognized they could not dictate to a great river; they could only accommodate its awesome power.

Since 1927, the lower Mississippi has not burst the levees, although it came dangerously close in 1973 and 1997. But containing the river had an unintended consequence. Previously, the river had deposited so much sediment that it actually created all the land from Cape Girardeau, Missouri, to the Gulf of Mexico. With the levees preventing periodic flooding, the sediment no longer replenished south Louisiana. And the land began to sink, making it more vulnerable to hurricanes. The loss has been greatly worsened by pipelines and shipping channels that cut through the vast marsh and speed erosion.

The 1927 flood's political and social consequences were possibly even more significant than its environmental legacy. The flood made Herbert Hoover president of the United States. A logistical genius, Hoover had already earned the nickname "the Great Humanitari-

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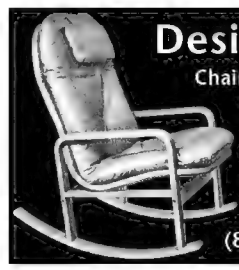

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an" for overseeing the distribution of food in occupied Belgium before the United States entered World War I. After the war, back in the United States, he ran food programs for Europe. In 1927, Hoover was Secretary of Commerce, and President Calvin Coolidge put him in charge of the rescue, care and rehabilitation of nearly a million people. He seized the opportunity. The flood crest took weeks to snake down the Mississippi River, giving the press the chance to cover battle after battle to hold the levees. It made for a bigger story than Katrina. In all of this, Hoover performed masterfully—organizing rescue fleets and displaced persons camps as well as the delivery of food and supplies—and he made sure everyone knew it. "The world lives by phrases," he once said. Portrayed as a hero in papers all across the nation, he confided to a friend, "I shall be the nominee, probably. It is nearly inevitable."

Hoover's presidential campaign began the shift of African-Americans from the Republican Party to the Democratic. The press had created Hoover's candidacy, and a potential scandal was brewing about abuses of—and virtual slavery imposed on—blacks in some of the refugee camps that he oversaw. This would have undermined Progressive support for him, threatening his candidacy.

How could he head off the scandal? There is irony in the answer. Since the South was then solidly Democratic, few whites were active in GOP politics, leaving the party of Lincoln in the hands of African-Americans throughout the region. Although blacks could not vote in most elections in the South, they could do so at the Republican National Convention. Hoover, both to protect himself from the abuse charges and to secure core delegates, in essence reached a deal with the national African-American leadership. He named a "Colored Advisory Commission" to investigate the abuses, and in return for the commission whitewashing the scandals and supporting his candidacy, Hoover promised to break large plantations into small farms and

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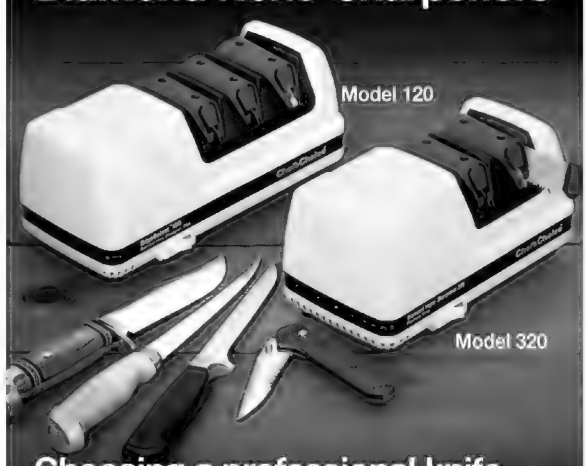

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turn sharecroppers into owners. Robert Moton, head of the commission and the Tuskegee Institute, said this would be "the greatest boon to the Negro since emancipation."

The blacks kept their word; Hoover broke his. This very personal betrayal snapped the emotional connection between the national African-American leadership and the GOP, and made it easier for Democrat Franklin Delano Roosevelt to attract black support for his policies four years later.

The 1927 flood also changed the face of many cities. The black migration out of the South had begun in World War I, but slowed to a trickle in the 1920s. In the flood's aftermath, hundreds of thousands of African-Americans moved from the flooded region to Detroit, Chicago, Los Angeles and elsewhere. In the 1930s, this migration dwindled, and did not pick up until after World War II and the mechanization of agriculture.

But the most important and most subtle change generated by the flood involved the way Americans viewed government. Before the flood, Americans generally did not believe government had a responsibility for individual citizens. Consider the yellow fever epidemic that had struck New Orleans in 1905: U.S. public health officials would not help New Orleans until the city put up $250,000—in advance—to cover federal expenses. Americans accepted this. Likewise, when a 1922 flood left 50,000 in Louisiana homeless, Governor John Parker, a close friend of Hoover's, refused not only to tap the federal government for help, he declined even to ask the Red Cross, declaring, "Louisiana has not asked for aid and will not."

Though the federal government in 1927 had a record surplus in its budget, not a dollar of federal money went in direct aid to any of the one million flood victims. (Hoover established private reconstruction corporations—they were failures.) The only money that the U.S. government spent was on supplies and salaries for military personnel who participated in the rescue.

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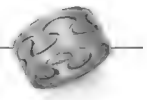

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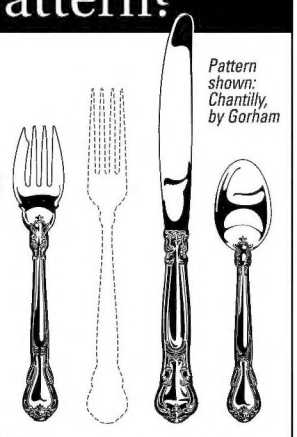

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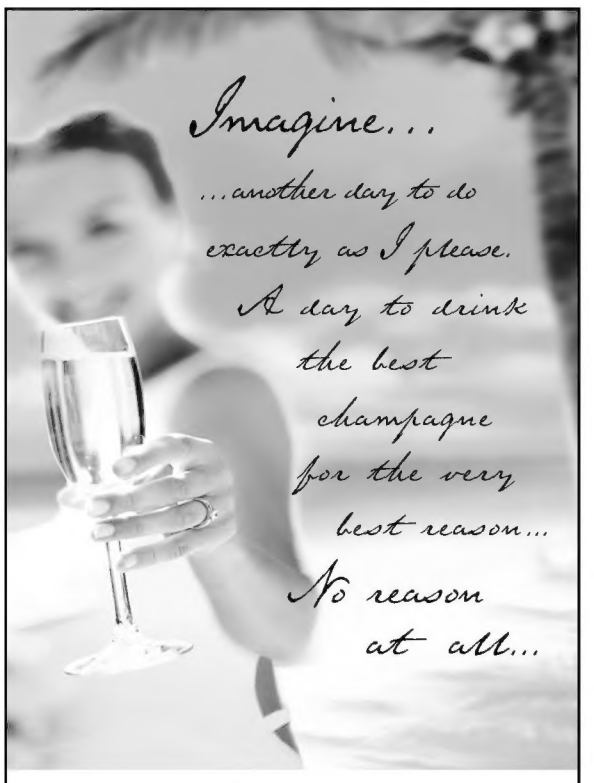
But Americans believed that the federal government should have done more. John Parker, no longer governor but then in charge of helping the 200,000 homeless in Louisiana, reversed himself and desperately sought all the outside help he could get. Across the nation, citizens demanded that the federal government take action. The sentiment became concrete a year later, when Congress passed the 1928 Flood Control Act, a law that would cost more than anything the government had ever done except fight World War I; the law would also set a precedent by giving the federal government more authority to involve itself in what had been state and local government decisions.

Today, many people are wondering if Hurricanes Katrina and Rita will have a similarly large impact on American life. Clearly, they will in some areas. Government on all levels will reexamine its ability to respond. Designers of major projects will give environmental forces a higher priority. Population will shift at least regionally, permanently affecting such cities as Jackson and Houston, not to mention New Orleans, Baton Rouge and Lafayette, and possibly extending to Atlanta and points in between. Political pressure to address global warming will likely increase, since most experts believe that a warmer Gulf of Mexico means, at the very least, more intense hurricanes.

But will Katrina and Rita change the way Americans think about even larger questions? The storms, like the 1927 flood, ripped open the fabric hiding some of the most disquieting parts of American society. It made George W. Bush sound almost like a liberal Democrat when he spoke of the "legacy of inequality" and said "poverty has roots in a history of racial discrimination, which cut off generations from the opportunity of America. We have a duty to confront this poverty with bold action."

If it is too early to tell what the largest long-term effects of these hurricanes will be, clearly it has rekindled the debate, begun during the flood of 1927, over the federal government's responsibility to citizens.



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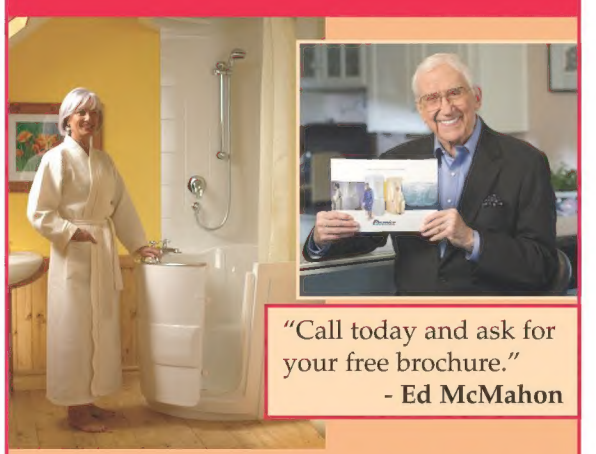

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BOOKS

WHEN TRUMPETS CALL: THEODORE ROOSEVELT AFTER THE WHITE HOUSE

PATRICIA O'TOOLE
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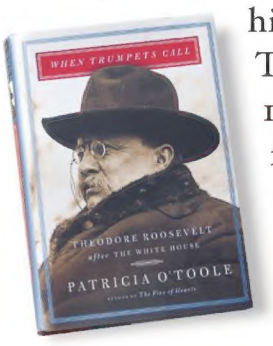
REVIEWED BY OWEN EDWARDS

MY MOTHER taught me never to judge a book by its cover. But in the case of Patricia O'Toole's new biography of Theodore Roosevelt during his post-presidential years, *When Trumpets Call*, the author and the designer, Evan Gaffney, have chosen a photograph that perfectly captures the text. The larger-than-life TR, wearing a broad-brimmed hat, his trademark pince-nez and a dark overcoat with fur collar—the man who personified America's muscular confidence—stares solemnly into an uncertain future on an overcast afternoon. Here, unmistakably, was a lion in winter.

In choosing to study Theodore Roosevelt's post-presidential years, which began in 1909 when his friend and political ally William Howard Taft succeeded him, and ended with TR's death at age 60 in 1919, O'Toole has found the most compelling of subjects. And this protean character, who prefigured his distant cousin Franklin's magnetic appeal and JFK's storied grace under fire, could possess no more excellent chronicler. Even if O'Toole's scholarship weren't so admirable, the narrative would yield rhetorical pleasures: "As president," she writes, "Roosevelt had overreached and overpreached, irritated, arrogated, and enervated."



From a human standpoint, Roosevelt's years after the White House are as engrossing as his presidency. At 42 and as the assassinated William McKinley's vice president, TR was the youngest man ever to become chief executive, and he offered a dramatic contrast to the rigid-

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ly formal and remote McKinley (once described, O'Toole notes, as a "bronze in search of a pedestal").

Just 50 and seemingly undiminished when he retired from politics, Roosevelt, with four children at home, planned to write for pay (which he did for very good pay indeed). He was leaving what he loved best. Ironically, because Roosevelt had completed McKinley's term and run for reelection only once, he had the right to run again. But he believed in the spirit of George Washington's precedent and so left public life voluntarily.

It was not in TR's nature to take it easy, though he claimed a desire to be left alone by the press and to remain out of the political fray "as long as I can make it." His first act as an ex-president was to sail to Africa in 1909 with his son Kermit on a yearlong safari. A mix of hunter and conservationist, Roosevelt justified shooting a swath across the African continent by sending back hundreds of specimens to the Smithsonian Institution. But on his return, dissatisfied with many of Taft's positions, including support for arbitration of international disputes, he plunged back into politics, eventually splitting the Republican Party and virtually handing the election to Woodrow Wilson in 1912. He considered, too, a run against Wilson (whom he despised) as World War I came to an end in 1918 and the fraught peace process began.

It was not to be. On January 6, 1919, Roosevelt, weakened by a fever he had contracted in the Amazon several years before and beset by a crippling attack of arthritis, died in the night of an undiagnosed blood clot. His wife, Edith, wracked with grief, made a deceptively laconic entry in her diary: "At four A.M., T. stopped breathing. Had had sweet sound sleep." His son Archie, in a cable to his brothers, put it differently: "THE OLD LION IS DEAD."

Reviewer OWEN EDWARDS *is executive editor of* Edutopia *magazine.*

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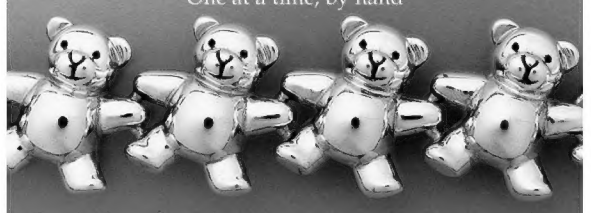

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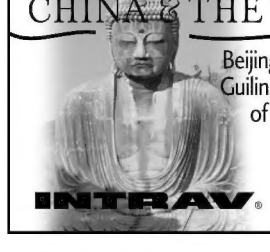

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SCRATCH THAT METAPHOR

WHY THE CORNER OFFICE SHOULDN'T BE A GLASS MENAGERIE **BY RICHARD CONNIFF**

In the business world, 800-pound gorillas run with the big dogs, swim with the sharks and occasionally find themselves up to their asses in alligators. And if they are not crazy like a fox, they can get caught like a deer in the headlights.

Yes, it's a jungle out there. Why else would H. Ross Perot have tormented the hapless, imperial CEO Roger Smith by declaring, "Revitalizing General Motors is like teaching an elephant to tap dance. You find the sensitive spots and start poking"? (Or did he say "lap dance"?) Why else would Warren Buffett lament corporate misgovernance by saying: "There is a tendency to put cocker spaniels on compensation committees, not Doberman pinschers"?

I don't mean to be a spoilsport. Businesspeople have a lot to learn from the animal world. But there are at least two problems here: one is that they trot out the same tired analogies over and over. Their companies spend millions developing iconic logos and otherwise polishing the corporate image, and then they go around prattling about lions, foxes and sharks. Predators ought to show a little more flair than that.

But what's worse is that they almost always get their animal behaviors wrong. So let's just dispense with a few myths right now:

YOU DON'T WANT TO BE AN 800-POUND GORILLA. No such animal has ever existed. The average big daddy silverback tops out at about half that weight. And gorillas are not predators, but vegans, with an almost unlimited appetite for fruit and bamboo shoots. I once worked on a TV documentary about lowland gorillas; on an average day the dramatic episodes consisted of the alpha male passing gas, picking his nose and yawning. Then he did the same things, the other way around. Over and over. This is probably not the image a hard-charging executive wants to present to the public.

NOR DO YOU WANT TO BE LIONIZED. Once, in Botswana, I saw a male lion rouse himself to court a female, with lots of growling and nipping. Finally, grudgingly, she assumed the sphinx position and he mounted her. One of my companions, a *National Geographic* photographer, began whirring and clicking (with his camera, I mean). The big moment of leonine love lasted all of ten seconds. "Definitely a motor-drive picture," the photographer muttered. Think about this the next time the preening CEOs at an awards banquet liken one another to lions.

OSTRICHES DON'T BURY THEIR HEADS IN THE SAND. They merely lower their heads to the ground to avoid detection while keeping an eye out for danger. They may even lie on the ground with necks outstretched. In the African savanna where they live, burying their heads in the sand would be a good way to get their tail feathers trimmed by a lion.

LEMMINGS DON'T LEAP OFF CLIFFS TO COMMIT MASS SUICIDE. When a population boom causes overcrowding, these Arctic rodents do the sensible thing and migrate en masse in search of a new home. A few may occasionally get crowded off a ledge as they swarm into unfamiliar territory. But it's an accident. Really.

REAL WEASELS DON'T WEAR TASSELED SHOES. And they spend much of their time chasing down mice, rats and other rodents. This makes them heroes, not villains. So if you cannot call the slimiest executive you know a "tassel-shoed weasel," what should you do? Just say "sleazeball" and leave innocent animals out of it.

HAVING A "SALMON DAY" IS EVEN WORSE THAN YOU THINK. Sales reps like to complain about having spent the day swimming upstream, only to get screwed and die. But real salmon merely spill their seed and their eggs on the streambed, leaving the little gametes to mix it up on their own. Meanwhile, the happy pair go belly up and drift away to get their hearts ripped out by a bear.

Then again, if you like animal analogies, this may be a more realistic characterization of a day in the life of the average sales rep.

RICHARD CONNIFF's new book is The Ape in the Corner Office: Understanding the Office Beast in All of Us *(Crown).*

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